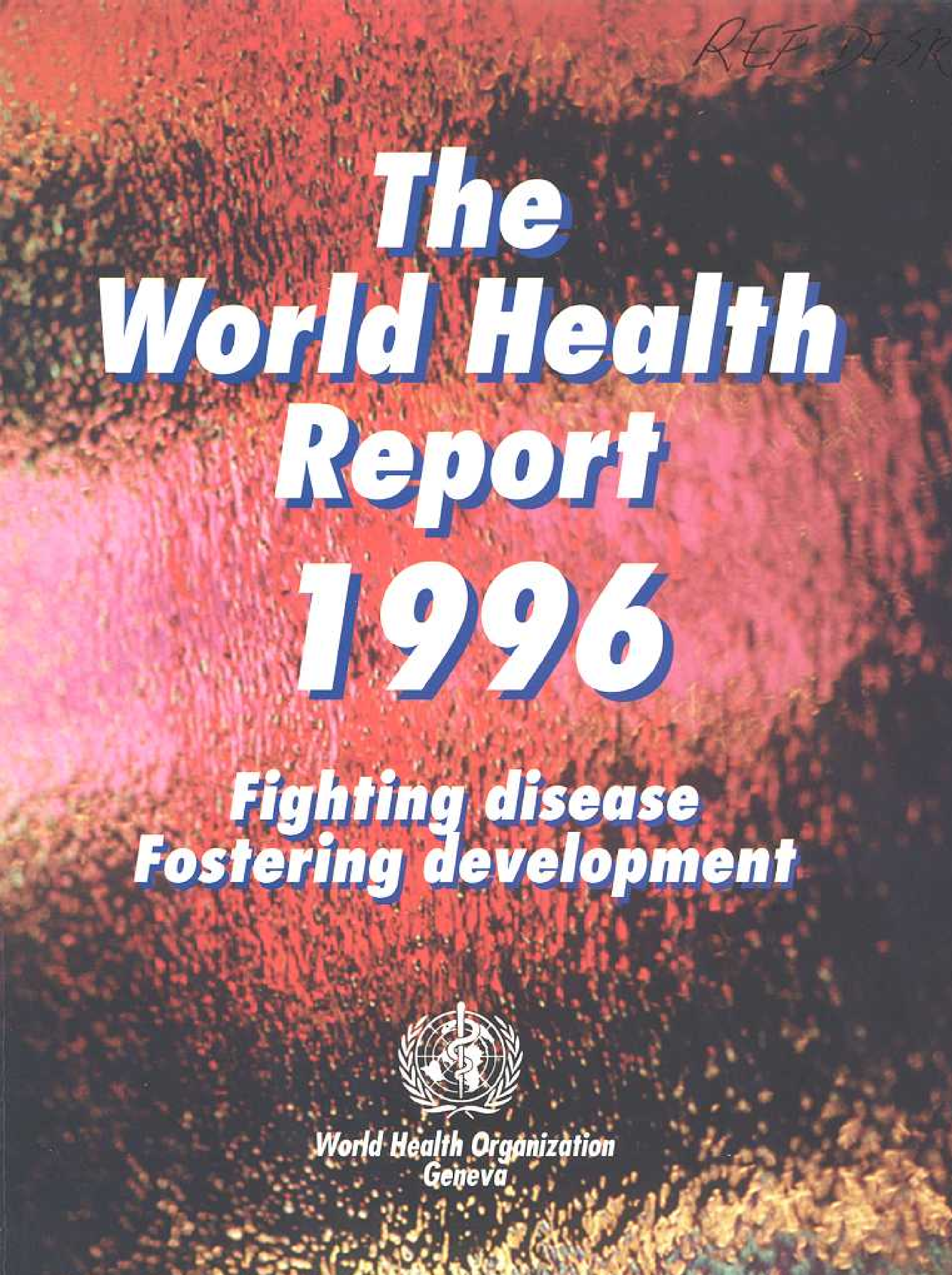
REF DISR



The World Health Report 1996

Fighting disease Fostering development

World Health Organization
Geneva

The World Health Report 1996

Fighting disease Fostering development

Report of the Director-General

World Health Organization
Geneva
1996

WHO Library Cataloguing in Publication Data

The world health report 1996: fighting disease, fostering development.
1.World health 2.Communicable disease control
3.Communicable diseases – transmission
4.Communicable diseases – epidemiology 5.Emerging diseases
6.Development 7.World Health Organization

ISBN 92 4 156182 3 (NLM Classification: WA 540.1)
ISSN 1020-3311

The World Health Organization welcomes requests for permission to reproduce or translate its publications, in part or in full. Applications and enquiries should be addressed to the Office of Publications, World Health Organization, Geneva, Switzerland, which will be glad to provide the latest information on any changes made to the text, plans for new editions, and reprints and translations already available.

© *World Health Organization 1996*

All rights reserved.

The designations employed and the presentation of the material in this publication, including tables and maps, do not imply the expression of any opinion whatsoever on the part of the Secretariat of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

Information concerning this publication can be obtained from:
Office of World Health Reporting
World Health Organization
1211 Geneva 27, Switzerland.
Fax: (41-22) 791 4870

Design and layout by WHO Graphics
Printed in France
96/10855 – Sadag – 11500

Contents

Message from the Director-General v

Chapter 1

The state of world health 1

The global situation – 1995 update 5

Control of infectious diseases 15

Infectious diseases according to mode of transmission 23

Infectious diseases and cancer 59

Chapter 2

WHO's contributions to world health 63

Emerging issues in infectious disease control 64

Infectious diseases, all ages, according to mode of transmission 65

Activities directed to specific age groups 71

Environment and lifestyles 79

Health care, organization and management 80

Regional highlights 91

Chapter 3

Charting the future 105

Disease trends 105

Priorities for action 110

Annex 1

New infectious diseases 112

Annex 2

Members and Associate Members of WHO 113

Annex 3

Statistics 115

Index 133

Message from the Director-General

> *Infectious diseases are attacking us on multiple fronts. Together they represent the world's leading cause of premature death.*

We stand on the threshold of a new era in which hundreds of millions of people will at last be safe from some of the world's most terrible diseases. Sooner rather than later poliomyelitis, leprosy, guinea-worm disease, river blindness, Chagas disease and neonatal tetanus will join smallpox as diseases of the past. Already, about 8 out of 10 of all the world's children are protected by immunization against six major childhood diseases.

These achievements would have been impossible without a dedicated international effort in creating awareness and stimulating action focused on the control of these diseases.

However, *The World Health Report 1996* shows that we also stand on the brink of a global crisis in infectious diseases. No country is safe from them. No country can any longer afford to ignore their threat.

The optimism of a relatively few years ago that many of these diseases could easily be brought under control has led to a fatal complacency among the international community. This complacency is now costing millions of lives – lives that we have the knowledge and the means to save, yet we are allowing to trickle through our fingers. Furthermore, most of the lives lost are in the vital age groups that societies rely on to alleviate poverty – school-age children and working-age adults – the potential workforces of tomorrow, and the actual workforces of today.

Infectious diseases are attacking us on multiple fronts. Together they represent the world's leading cause of premature death. At least 17 million people were killed by them last year, including about 9 million young children who died from such preventable causes as diarrhoea and pneumonia. Millions more were disabled even though effective measures to prevent them are available.

Many countries and the international community have reduced their investment in the control of diseases that cause heavy economic and human tolls. The socioeconomic development of many nations – their prospect of a better future – is being crippled by the burden of these diseases. Other countries are paying a huge price in lost foreign currency income from food trade and tourism as a result of epidemics of cholera, plague and other diseases.

Major diseases such as malaria and tuberculosis are making a deadly comeback in many parts of the world. In addition to HIV/AIDS, other new and highly infectious diseases such as Ebola haemorrhagic fever are emerging at an unprecedented rate – at least 30 have been recorded in the last 20 years – and many of them are incurable. Until recently, antibiotics were regarded as the solution to many infectious diseases. Today they are becoming less and less effective as resistance to them spreads. Meanwhile, evidence gathers on the role of viruses, bacteria and parasites in the genesis of deadly cancers of the stomach, cervix and liver. Fears are also growing of a possible food chain link between bovine spongiform encephalopathy (BSE or "mad cow disease") and a form of the incurable Creutzfeldt-Jakob disease in humans, due to an infectious agent that affects the brain.

Today's crisis is likely to get worse before it gets better. Internal and international movement of populations including refugees and migrants, haphazard and uncontrolled urbanization, economic development and changes in patterns of land use as well as in ecology and climate are creating new opportunities for the spread of infections. Because of rapidly increasing international air travel, there is also a growing risk that diseases will spread within days or even hours from one continent to another. The expanding world trade and marketing of foods carries with it the threat of foodborne diseases.

Changes in lifestyle and behaviour are an additional factor in the emergence of some infectious diseases, particularly those that are sexually transmitted.

As well as identifying these problems, this report recommends workable solutions. It suggests priorities, spelling out what must be done by the global community at national, regional and international levels. The only answer to a global threat is a global response – a response of the kind that saw smallpox vanquished for ever, and saw the protection of the world's children as a priority. What is needed now is global solidarity that goes beyond selfish interests and national boundaries; it must provide a truly unprecedented response to make this world a safer and healthier one for all – rich or poor, male or female, young or old.

The focus now must be to renew the attack on those major diseases that are already targets for elimination or eradication. Extra resources must be mobilized against them, because to slacken the pace now would be to compromise progress already made. The surveillance and control of infectious diseases must be improved, and laboratory facilities for rapid recognition of outbreaks and monitoring antibiotic susceptibility have to be strengthened; they should be in the mainstream of health systems development. Intensive research on new and emerging diseases and on ways of controlling them has to be promoted and supported. If catastrophe is to be avoided, education of people in simple personal hygiene practices and basic food safety measures should be intensified.

The report also shows what the World Health Organization is undertaking in a wide range of activities against infectious diseases. The experience of dealing with recent outbreaks of cholera, plague and Ebola haemorrhagic fever has shown the need to strengthen global preparedness and readiness for epidemics. As it supports development of national expertise and capability, the Organization is strengthening its own capacity to respond rapidly and more efficiently to calls for help in such emergencies. It aims to have a team of experts at the location of an outbreak anywhere in the world within 24 hours of being officially notified of it. Extra resources are being sought to fund these operations.

The world has lost sight of its priority to reduce poverty through better health and foster development by fighting disease. Today, infectious diseases are not only a health issue; they have become a social problem with tremendous consequences for the well-being of the individual and the world we live in. We need to recognize them as a common threat that has been ignored, at great cost, for too long, and to build the global solidarity to confront them. What is required is the commitment of the international community to helping countries most at risk to help themselves. By helping each other, nations united protect the world and protect themselves.

The World Health Report 1996 shows what can be done. It provides an expert and unique assessment of the crisis in infectious diseases and issues today a call for action that the world must not ignore.

Hiroshi Nakajima, M.D., Ph.D.
Director-General
World Health Organization

Chapter 1

The state of world health

A fatal complacency

Until a relatively few years ago, there was a sense of optimism that the long struggle for control over infectious diseases was almost over. Smallpox was eradicated. Poliomyelitis, guinea-worm disease, leprosy, Chagas disease and neonatal tetanus were targeted for eradication or elimination. Some 8 out of 10 of the world's children were immunized against half a dozen killer diseases. Antimicrobial drugs were effectively suppressing countless infections.

But cautious optimism has turned into a fatal complacency that is costing millions of lives every year. The struggle for control, far from being over, has reached a critical stage. Infectious diseases remain the world's leading cause of death, accounting for at least 17 million (about 33%) of the 52 million people who die each year. Apart from those 17 million – about 9 million of whom are young children – up to half the world's population of 5.72 billion people are at risk of many endemic diseases.

Diseases that used to be restricted geographically, such as cholera, are now striking in regions once thought safe. While some diseases have been almost completely subdued, others such as malaria and tuberculosis that have always been among our greatest enemies are fighting back with renewed ferocity. The role of infectious agents in the development of many types of cancer is becoming more evident.

New diseases, new threats

New and emerging diseases, combined with the rapid spread of pathogens resistant to antibiotics and of disease-carrying insects resistant to insecticides, are daunting challenges to human health. The new diseases range from AIDS to little-known but equally lethal viral infections. In many cases, their source is unknown, as is the reason for their emergence. More often than not, no specific treatment is yet available for them.

Antibiotic resistance in hospitals worldwide threatens to leave medical and public health workers virtually helpless in the prevention or treatment of many infections. Many of the most powerful antibiotics have been rendered impotent. Disastrously, this is happening at a time when too few new drugs are being developed to replace those that have lost their effectiveness. In the contest for supremacy, the microbes are sprinting ahead. The gap between their ability to mutate into drug-resistant strains and man's ability to counter them is widening fast.

These are tragic developments, given the achievements that have been made in global disease control. The discovery of antibiotics, the development of vaccines and, more importantly, the introduction of environmental sanitation measures coupled with better understanding of infectious disease epidemiology, have been invaluable weapons in the fight for human health.

Ironically, the present crisis is being acted out against a global economic and demographic background that again gives some cause for optimism. Industrialized countries are emerging from recession. Inflation is relatively under control. Clear signs of economic recovery are visible in many countries making the transition from central planning towards market systems.

Developing countries are enjoying relatively high rates of growth in their gross domestic product. Even in Africa where many of the world's least devel-

Diseases that used to be restricted geographically, such as cholera, are now striking in regions once thought safe.

oped countries are found, modest economic improvements are discernible. Global rates of births and deaths are decreasing. Life expectancy in general is increasing; and more people are enjoying improved quality of life, better employment prospects and freedom to travel.

The price of failure

However, the re-emergence of infectious diseases is a warning that progress achieved so far towards global security in health and prosperity may be wasted unless effective development policies are formulated, and commitments are made to implement them nationally and internationally.

The re-emergence of infectious diseases is a warning that progress achieved so far towards global security in health and prosperity may be wasted.

Infectious diseases range from those occurring in tropical areas (such as malaria and dengue haemorrhagic fever, which are most common in developing countries) to diseases found worldwide (such as hepatitis and sexually transmitted diseases, including HIV/AIDS) and foodborne illnesses that affect large numbers of people in both the richer and the poorer nations.

Infectious diseases are also classified according to their mode of transmission from their source (human, animal or environmental) to a new host. Transmission can happen by direct person-to-person contact, through insects and other vectors, by way of contaminated vehicles such as water or food, and in other more complex ways. The reality today is that there are ominous trends on all fronts. By focusing on the way diseases are transmitted, this report explains how the present situation has arisen, and what human interventions are needed in order to achieve prevention or control.

The struggle for control

A few examples illustrate the impact of infectious diseases on human health and development:

- *Malaria* – the worst of the insect-borne diseases – still strikes up to 500 million people a year, killing at least 2 million.
- *Acute lower respiratory infections* kill almost 4 million children every year. Tuberculosis, similarly spread from person to person, kills 3 million people a year and one-third of the global population carries the bacilli that cause it.
- *Diarrhoeal diseases*, spread chiefly by contaminated water or food, kill nearly 3 million young children every year. Cholera epidemics are occurring in countries ranging from South-East Asia to the Middle East, and as far apart as western Africa and South America.
- *HIV*, the virus that causes *AIDS*, is predominantly transmitted sexually, and has already infected up to 24 million adults, of whom at least 4 million have died. More than 330 million new cases of other sexually transmitted diseases occurred in 1995.
- *Viral hepatitis* is another major problem worldwide. This term is used to describe a group of several distinct infections which are similar in many ways, but which nevertheless differ in some of their characteristics, and in their prevention and control. At least 350 million people are chronic carriers of the hepatitis B virus, and another 100 million are chronic carriers of the hepatitis C virus. At least a quarter of them will die of related liver disease.
- Some of the ten million new cases of *cancer* diagnosed in 1995 were caused by viruses (hepatitis B and hepatitis C among them), bacteria and parasites. WHO estimates that 15% of all new cancer cases could be avoided by preventing the infectious diseases associated with them.

Breaking the chains

In all types of infectious disease, prevention and control depend on breaking the chains of transmission. A handful of diseases are within range of elimination or eradication in the next few years and others are under control, thanks largely to effective public health measures (particularly global immunization programmes) and other interventions. Poliomyelitis and guinea-worm disease, for example, could be eradicated by the end of the century. Other diseases, such as leprosy, could be eliminated as public health dangers by reducing their prevalence to a very low level.

Attaining freedom from infectious disease is one of humanity's foremost preoccupations. But breaking the chains that shackle people to these diseases is an immensely difficult task. It has been fully achieved only once, with the last reported case of smallpox in 1977. The fact that such success has not been repeated is due not primarily to lack of knowledge or tools, but more to logistics problems and a series of events and developments, some natural and others man-made, that have occurred in recent years. Some are poverty-related, while others are the consequences of economic prosperity.

Obstacles to success

Poverty is on the increase, so that hundreds of millions of people are bound by their living conditions to the daily hazard of infectious disease. More than one-fifth of the world's population lives in extreme poverty. Almost a third of all children are undernourished. Half the people in the world lack regular access to the most needed essential drugs.

Continuing global population growth, combined with rapid urbanization, means that many millions of city dwellers are forced to live in overcrowded and unhygienic conditions, where lack of clean water and adequate sanitation provide breeding grounds for infectious disease. High-density populations raise the risk of respiratory diseases and those transmitted through contact with pathogens in food and water.

In addition, more than 90% of expected population growth in the coming decades will be in the developing regions of Africa, Asia and Latin America – the regions of richest biological diversity. Human encroachment on tropical forests has brought populations with little or no disease resistance into close proximity with insects that carry malaria and yellow fever and other, sometimes unknown, infectious diseases.

Because of the economic and social crises that still affect many countries, health systems which should offer protection against disease have, in extreme cases, either collapsed or not even been built. The immediate result is a resurgence of diseases that were once under control or should be controllable, given adequate resources. Disabled by these diseases, some societies are unable to get themselves back on their feet and cannot afford the health services that they need.

Migration and the mass movement of millions of refugees or displaced persons from one country to another – as the result of wars, civil turmoil or natural disasters – also provide fertile breeding grounds for infectious diseases and keep them on the move (*Box 1*).

Increases in international air travel and the growing traffic in trade and tourism mean that disease-producing organisms, the deadly as well as the commonplace, can be transported rapidly from one continent to another (*Map 1*). There are now about 5 000 airports with scheduled worldwide services. Air travel has increased by almost 7% a year in the last 20 years and is predicted to increase by over 5% a year during the next 20 years.

Reporting of infectious diseases now poses serious economic threats to trade and tourism. Some countries impose unjustified restrictions on travellers coming from infected countries; others are tempted to conceal information about infections within their own borders. The result is a fragmented, uncoordinated approach to infectious disease control and inadequate global information to allow worldwide monitoring.

As a result of changes in human sexual behaviour, more people are exposed to sexually transmitted diseases. Worldwide, almost a million people contract such diseases every day, mostly young adults.

Other changes in global food trade create new opportunities for infections to flourish. They include the shipment of livestock; food production, storage

In many countries, health systems which should offer protection against disease have, in extreme cases, either collapsed or not even been built.

and marketing; and altered eating habits.

Social changes place certain age groups at higher risk from infectious diseases – for example the clustering of young children in day-care centres, and the growing numbers of the elderly in nursing homes.

Expanding areas of human habitation put additional millions of people at risk from pathogens previously rare or unknown as causes of human disease. The effects of climatic change may give some diseases the opportunity to spread to new geographical areas (*Box 2*). Antimicrobials have become ubiquitous. Microbes, meanwhile, continue to evolve and adapt to their environment, as they have always done, adding antimicrobial resistance to their evolutionary pathways.

For all the reasons given above, controlling infectious diseases remains a global challenge. In addition, the social and economic costs of infectious diseases are far from negligible for individuals, families and communities (*Box 3*).

The call for action is directed not just at those working in the field of health, since the reasons for the present crisis are multiple. They are political, social, environmental and to a significant extent self-inflicted – the by-products of the modern world.

This report does not attempt to be a comprehensive reference work on infectious diseases. Diseases included for illustrative purposes (*Table 1*) were selected in the following way:

- diseases targeted by WHO for eradication, elimination or control;
- diseases of significance to one or more WHO regions (e.g. Chagas disease);
- other new and emerging diseases and issues which are a global threat.

The list includes all the diseases identified for international health action by the World Summit for Children (1990), the Earth Summit at Rio (1993), the International Conference on Population and Development (1994) and the World Summit for Social Development (1995).

Drawing on the most up-to-date information available, this report provides

Box 1. Migration and infectious diseases

The impact of international migration on the global spread of infectious diseases is likely to increase as more people move around the world, faster and over longer distances than before. History shows what can happen. Smallpox and measles were unknown in the Americas before the arrival of the Spanish conquistadors 500 years ago. International anxiety over recent outbreaks of plague in India and Ebola fever in Zaire reflected the deeply rooted perception that foreigners can carry contagious, possibly dangerous diseases.

Three-quarters of the world's population live in developing countries. The economic polarization between them and wealthier countries is leading to increased migration, as are internal conflicts. The workforces of many industrialized nations increasingly depend on youthful immigrants from poorer countries. Today approximately 120 million persons live outside their country of birth, and millions move every year in search of better living conditions.

The great majority of immigrants to developed countries come from areas where many infectious diseases flourish. In general, most migration-related diseases manifest themselves shortly after migration; most, such as intestinal worms, are fairly harmless. Relatively few outbreaks of migration-related malaria and other mosquito-borne diseases have occurred in recent years. International migration may pose challenges to the national services concerned with surveillance and control of infectious diseases, particularly when those arriving have not been immunized to the same extent as the host population, or are not in the age group targeted by national immunization programmes.

Due to wars, civil strife and natural disasters, many displaced persons and refugees find themselves in camps where conditions are ideal for the spread of diseases – inadequate sanitation, contaminated water supplies and gross overcrowding. Initially, during the first weeks or months of makeshift camps or disorderly mass movements of populations, high death rates result from diarrhoeal diseases and acute respiratory infections.

Migrants should not be seen as conveyors of infectious diseases. There are as many businessmen, tourists and other short-stay visitors crossing international borders per day as there are migrants per year. Although most of those other travellers have the means to stay in clean hotels, there is ample evidence that they do not avoid close contact with the native population they visit, and do bring home their share of infectious diseases.

A worldwide review of disease detection and prevention strategies is required. The situation is complex, given the diversity of travellers and migrant groups, the geographical points of departure and arrival, and the differing health policies of countries. Differences in national approaches, as witnessed during the plague outbreak, will only fuel people's fears. Assessing and dealing with new and emerging infectious diseases require intensive cooperation between countries and multidisciplinary collaboration within countries.

These approaches must occur in a non-punitive, non-discriminatory setting that protects human rights. Policies to prevent the importation of migration-related disease can be misguided, ineffective and counterproductive. In recent years, many countries introduced border restrictions or mandatory HIV testing of immigrants. Such screening measures spark unfounded suspicion of foreigners and are useless to control HIV epidemics.

Source: International Organization for Migration (personal communication).

an assessment of the global impact of many of these diseases, identifies priorities for action against them, and recommends measures to be taken nationally and internationally.

The global situation – 1995 update

As already mentioned, there were glimmers of hope for the world in 1995: rising and sustainable economic growth, decreasing birth and death rates, and slowing growth of urban populations. At the same time, it is clear that deep pockets of poverty, ill-health and suffering persist in many parts of the world, and are at their worst among urban populations and in areas torn by internal strife, conflict and political instability.

The burden of infectious disease, illustrated by mortality and morbidity rates for infants, children and adults – and reflected in life expectancy – is heaviest of all for these populations, and has serious public health implications for the rest of the world. For control of infectious diseases is not merely a medical or biological issue: it is a challenge for society and human development.

This section gives an overview of global issues relevant to human health in general and to the control of infectious diseases in particular.

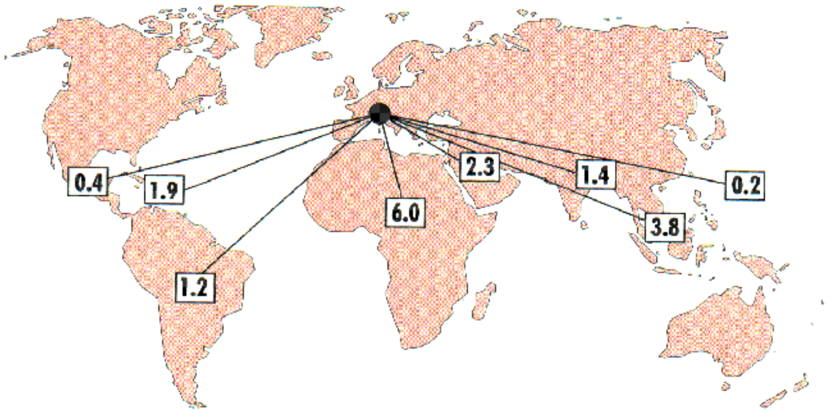
The world economy

Present optimism about the world economy is based on 1995 evidence of the most rapid growth in total world output – and thus total income – of the 1990s. Real output per capita has risen in most countries in the last 15 years. Less than a third of countries were expected to experience a decline or stagnation in that output in 1995, compared to more than half in 1993.

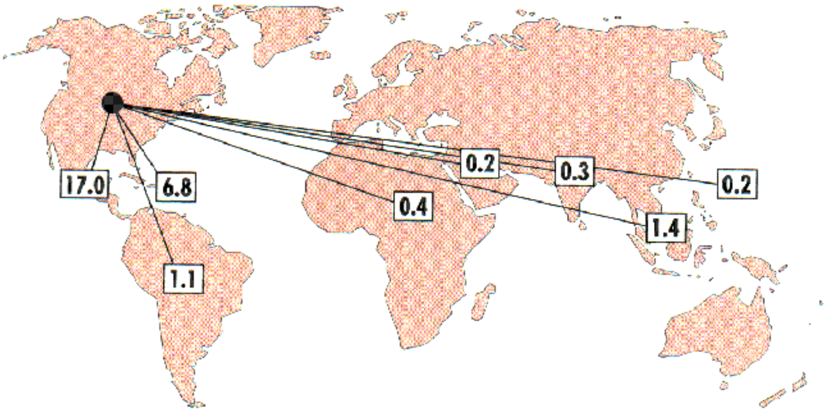
Developed market economies that account for about 75% of world output are gradually emerging from recent recession, with inflation relatively under control. For the fourth consecutive year, the global domestic product of developing countries is continuing to rise and

Map 1. Travellers to developing areas, 1993
(in millions)

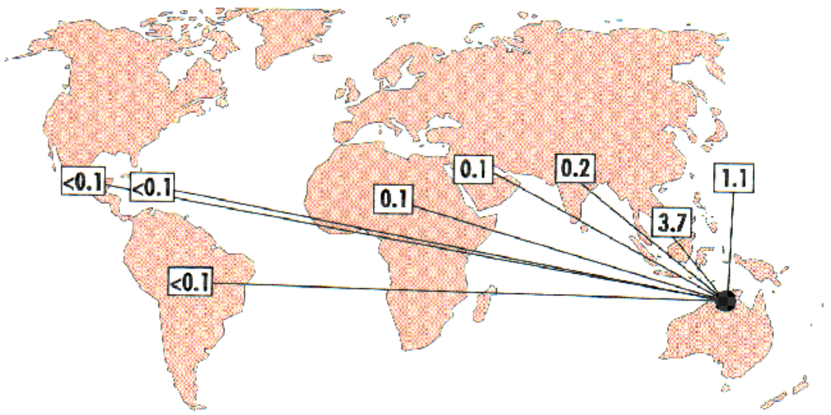
From Europe



From USA and Canada



From Japan, Australia and New Zealand



Source: World Tourism Organization, 1995.

WHO 96080

the trend is expected to continue in 1996. Many countries in transition from central planning to market systems show clear signs of economic recovery. In Africa, the overall pace of output growth has increased, and per capita output is expected not to fall in 1995. Conditions for a pick-up in growth are improving in many of the world's poorest countries.

All these trends are welcome. To gauge their influence on global health, other factors such as global politics and trends in education, migration and population growth, are reviewed below. More specific issues affecting infants, children, men and women – such as fertility, life expectancy and mortality – are also examined.

The global political situation

Startling changes in world politics and economics in recent years have provided undreamed-of opportunities for some peoples and countries, but increased impoverishment, inequality and insecurity for others.

Capital, goods and people now move around the globe at great speed and in a complex manner. Computerization creates jobs for some and destroys them for others; it also results in new working relations and power relations within and between countries. These are unavoidable trends in global development.

But while the expansion of liberal democracy gives freedom to many more people and offers new possibilities in nation-building and development, violent conflicts and civil wars have escalated greatly since the end of the Cold War in the 1980s. Many nations or states are embroiled in bitter feuds. Political maps are being redrawn as a multitude of ethnic and political groups emerges, making claims and parcelling out new territories.

In many cases, massive refugee movements result. There are an estimated 14.5 million refugees today who have been granted asylum in another state. A further 5.4 million are displaced within their own countries, 4 million former refugees have returned to their homelands, and the welfare of another 3.5 million living outside their own

Box 2. Climate change: impacts on public health

Scientific evidence suggests that trends in global warming and changing patterns of extreme weather conditions seen in the past few decades may herald unprecedented climate change. These processes are brought about by the accumulation of "greenhouse" gases in the atmosphere, due to the massive combustion of fossil fuels, large-scale deforestation and the rapid expansion of irrigated agriculture and cattle ranching worldwide. This enhanced "greenhouse" effect, combined with increased ultraviolet radiation as a result of stratospheric ozone depletion, may already be affecting human health in many parts of the world.

The various components of global environmental change conspire to alter the potential for the transmission of infectious disease. For example, changes in the geographical distribution of mosquitos and other carriers of such vector-borne diseases as malaria, yellow fever, dengue and schistosomiasis would result from climate change, deforestation and desertification.

However, in most countries with intense urbanization, modern agriculture and industrial development there will be a relatively small risk that vector-borne diseases would recur, as many of the environmental prerequisites for transmission would no longer prevail. The well-developed health care systems in some of these countries are a further safeguard against epidemiological contingencies.

Sudden epidemics of some arboviral zoonoses can occur in extreme weather conditions which are related to climate change and which favour explosive population growth in the animal reservoir species or the vectors. Lyme disease, carried by ticks, is spreading in North America and Europe because of changed land-use patterns and milder winters.

As a direct effect of global warming, heat-related mortality rates, particularly in cities, may increase among the very old, the young and those suffering from chronic respiratory and cardiovascular disorders. Although the health consequences of increased exposure to ultraviolet radiation are still poorly understood, these may lead to diminishing immunity to a variety of infectious and other diseases, including several forms of cancer.

High temperatures and ultraviolet radiation at ground level augment the formation of photochemical "smog". Pollen levels are sensitive to increases in temperature as well as humidity. People suffering from chronic respiratory disorders (e.g. asthma, allergies) will be among the first to experience such indirect impacts of climate change.

Scientific knowledge of climate variability, climate change and the effects that these have on public health is still incomplete. The margins of confidence for current predictions of climate change, based on expected emission levels of carbon dioxide and other "greenhouse gases" and airborne particulates in the year 2050, are rather wide. Forecasting the potential direct and indirect impacts on health is therefore difficult. It is even more difficult to predict the indirect effects of climate change that may result from poorly understood changes taking place in ecosystems. The economic and demographic impacts of climate change may further alter the risks of disease transmission and the capacity of countries to deal with them in the coming decades.

WHO seeks to collaborate with other agencies in the UN system and elsewhere, in order to develop appropriate research methodologies worldwide and to promote capacity-building at the country level. The aim is to assess vulnerability and assist the planning of suitable mitigation and adaptation measures to protect human health.

Box 3. The cost of infections

Apart from causing many millions of deaths, infectious diseases reduce the quality of life of millions of people, hinder children's education, reduce land availability for cultivation and human habitat, damage productivity and divert available household resources. Poverty is thus perpetuated for generations. At the 1978 Conference on Primary Health Care in Alma-Ata, WHO and UNICEF revealed not only the dependence of health on economic and social development but also the contribution that a healthy society can make to development itself. Health is not only the end but an essential means to achieve economic growth and human welfare. International evidence shows how disease eradication or control can enhance development.

The annual financial cost of common infectious diseases in the United States is estimated by the National Science and Technology Council as follows (these costs, combined with dollars spent on AIDS and tuberculosis, exceed \$120* billion per year):

Intestinal infections
\$23 billion in direct medical costs and lost productivity
Foodborne diseases
\$5-6 billion in medical and productivity costs
Sexually transmitted diseases
\$5 billion in treatment costs (excluding AIDS)
Influenza
\$5 billion (direct medical costs) and
\$12 billion (lost productivity costs)
Antibiotic-resistant bacterial infections
\$4 billion in treatment costs
Hepatitis B virus infection
\$720+ million in combined direct and indirect costs

The cost of a selection of infectious diseases in developing countries is estimated as follows:

Malaria. Based on case studies in Burkina Faso, Chad, Congo and Rwanda, the cost of an average case of malaria in sub-Saharan Africa has been calculated as equivalent to about 12 days of productive output. The total cost for the area in 1995 was projected at \$1 684 million or 1% of the GDP (having risen from \$791 million or 0.6% of the GDP in 1987):

- in Burkina Faso, the cost of each case of malaria amounted to over 19 days of per capita output;
- in Rwanda, the average cost of each malaria case in 1987 was estimated at \$11.8;
- in Sudan, those affected by malaria were unable to work for 22% of the time during the course of a year;
- in the Solomon Islands, a child suffering from malaria is absent from school for 5.3 days on average.

Onchocerciasis. Since the WHO Onchocerciasis Control Programme was launched in 1974 in West Africa, more than 1.7 million additional years of productive labour have become available as a result of control measures. An additional 25 million hectares of usable land could be made available for agricultural production. This could feed 17 million more people a year.

Treatment of ***intestinal helminth infection*** improved the results of cognitive function tests among schoolchildren and reduced school absenteeism in Jamaica.

Treatment of ***schistosomiasis*** among sugar-cane cutters in the United Republic of Tanzania increased their productivity.

AIDS. The cost of treating existing cases in Rwanda potentially amounts to 60% of the public health budget.

Guinea-worm. In Nigeria, rice production loses about 12% of person-days as a result of this disease.

For families, the direct costs of medical care and lost income often result in severe financial problems. Assets such as livestock and land are sold (as in Kenya, where ill-health is the cause of 24% of land transactions). In Côte d'Ivoire, average medical expenditure at the time of an illness exceeds full-time minimum-wage earnings lost as a result of the illness.

Initial findings of a WHO study confirm relationships among improvements in health status indicators such as infant mortality rate and life expectancy at birth, and subsequent increases in the productivity of the economically active population in agriculture and service sectors. The relationship with productivity in the industrial sector is less marked but nevertheless positive.

countries is of concern to the United Nations High Commissioner for Refugees (UNHCR). Seventy countries report refugee populations of at least 10 000 people.

Education

Education is essential for national development. Globally, more than 75% of the adult population were literate in 1995 but rates of literacy varied from less than 50% for the least developed countries to about 70% for the developing

---

* Throughout this report the sign \$ denotes United States dollars.

Table 1. Selected infectious diseases and emerging issues of global and/or specific regional significance, including those recognized as important by international forums

Selected diseases/conditions by main mode of transmission	Global priorities	Diseases of concern to:						Diseases identified by international forums
		Africa	Americas	Eastern Mediterranean	Europe	South-East Asia	Western Pacific	
Person to person								
Acute lower respiratory infection (ALRI)	X	X		X	X		X	X
Diphtheria	X	X		X	X	X	X	X
Influenza		X	X	X	X			
Leprosy	X	X	X	X		X	X	
Measles	X	X	X	X	X	X	X	X
Meningococcal meningitis		X	X	X		X	X	
Tuberculosis	X	X	X	X	X	X	X	X
Whooping cough (pertussis)	X	X		X	X	X		X
Poliomyelitis, acute	X	X	X	X	X	X	X	X
Trachoma		X		X				
HIV/AIDS	X	X	X	X	X	X	X	X
Sexually transmitted diseases	X	X	X	X	X	X	X	X
Hepatitis B, viral	X	X	X	X	X	X	X	
Hepatitis C, viral		X	X	X	X	X	X	
Food-, water- and soilborne								
Cholera		X	X	X	X	X	X	X
Diarrhoea	X	X	X	X	X	X	X	X
Dracunculiasis (guinea-worm infection)	X	X		X		X		X
Giardiasis				X				
Hepatitis E, viral				X		X		
Schistosomiasis		X		X			X	X
Shigellosis				X	X			
Trematode infections				X		X		X
Typhoid and paratyphoid		X	X	X	X			
E. coli O157: H7 infections					X			
Hepatitis A, viral			X	X	X	X		
Salmonellosis (other than typhoid and paratyphoid)			X	X	X			
Ascariasis		X	X	X		X		
Hookworm diseases		X	X	X		X		
Tetanus, neonatal	X	X	X	X		X	X	X
Tetanus, other	X					X		X
Trichuriasis			X	X				
Insect-borne								
Dengue fever		X	X	X		X	X	
Dengue haemorrhagic fever		X	X			X	X	
Filariasis (lymphatic)		X		X		X		X
Japanese encephalitis						X		
Malaria	X	X	X	X		X	X	X
Yellow fever		X	X					
Chagas disease (American trypanosomiasis)	X		X					
Leishmaniasis, cutaneous and mucocutaneous				X		X		
Leishmaniasis, visceral (kala-azar)			X	X		X		
Onchocerciasis (river blindness)	X	X	X	X				X
Plague		X	X			X		
Sleeping sickness (African trypanosomiasis)		X		X				
Animal-borne								
Brucellosis			X	X		X		
Rabies (dog-mediated)		X	X	X		X		
Other new and emerging diseases/infections, *including:*	X			X				
Arbovirus infections								
Bovine spongiform encephalopathy								
Ebola virus infections		X		X				
Hantaan virus disease			X		X			
Lassa fever		X						
Listeriosis								
Other emerging issues, *including:*	X							
Antibiotic resistance and hospital infections		X	X	X	X			

world and 99% for the developed world. Although literacy rates for people aged 15 years and above have increased in all regions, most significantly among women, nearly two-thirds of the world's illiterate adults are still women (565 million); most of them live in the developing regions of Africa, Asia and Latin America. Worldwide, the absolute number of illiterates is expected to decline slightly from about 900 to 870 million by the year 2000, but the day when adult illiteracy will totally disappear remains distant.

Over a billion young people – nearly one-fifth of the world's population – are enrolled in formal education today compared to around 300 million in the early 1950s; but a quarter of the world's girls are estimated to be out-of-school compared to around one-sixth of the world's boys. While disparity between male and female literacy rates appears to be diminishing in most developing regions, it is expected that illiteracy will become an increasingly female phenomenon by the year 2000. Yet achieving rapid advances in the educational participation of girls is tied closely to overall development prospects in general. Although women are increasing their presence in higher education, they still encounter major obstacles when they try to apply their education to social and economic advancement.

Population and its growth

In mid-1995, the global population was about 5.7 billion people. It is projected to reach 7.9 billion in 2020, and 9.8 billion in 2050. The current population growth rate of 1.6% a year is the lowest recorded since the Second World War, and is expected to decline further, to 1.3% a year by 2010 and 0.5% by 2050.

Not surprisingly, the decline is slowest in the world's 48 least developed countries, with an estimated growth rate of 2.9% in 1995, projected to reach 1.1% by 2050. The overall picture is of the global population growing by about 90 million a year for the next 20 years, and falling to about 50 million more a year by 2050. By then, the least developed countries will have a population of about 1.7 billion, or 17% of the total population, compared to about 589 million (about 10%) today. The developing world will have a population of 8.5 billion in 2050, 86% of the total population.

These figures suggest that, for the foreseeable future, the heaviest burdens of ill-health will continue to fall on those who live in developing countries, especially in those countries whose populations are growing fastest, and which are least able to sustain economic development.

Most of the world's countries are WHO Member States (190 in all), covering a total population of 5701 million, or 99.7% of the world population in 1995.

Migration

International migration is an important factor in the changing world of the 1990s, and has influenced the composition of societies in at least 120 countries in the last five years. Migrants are usually at the peak of their child-bearing years and contribute to increases in established foreign or foreign-born populations within recipient countries. They tend to follow in the footsteps of their fellow countrymen and live concentrated in particular areas. Cultural differences within a community raise issues of ethnic relations, social integration and equality that can pose problems for host countries.

Between 1990 and 1995 the influx of migrants has been most marked in Europe, the Americas and Africa. By contrast, more people have emigrated from South-East Asia, the Western Pacific and the Eastern Mediterranean than have migrated to those regions. African migration consists mainly of refugee movements confined to the same region, with the origin in one country and the destination in a neighbouring country (*Box 1*).

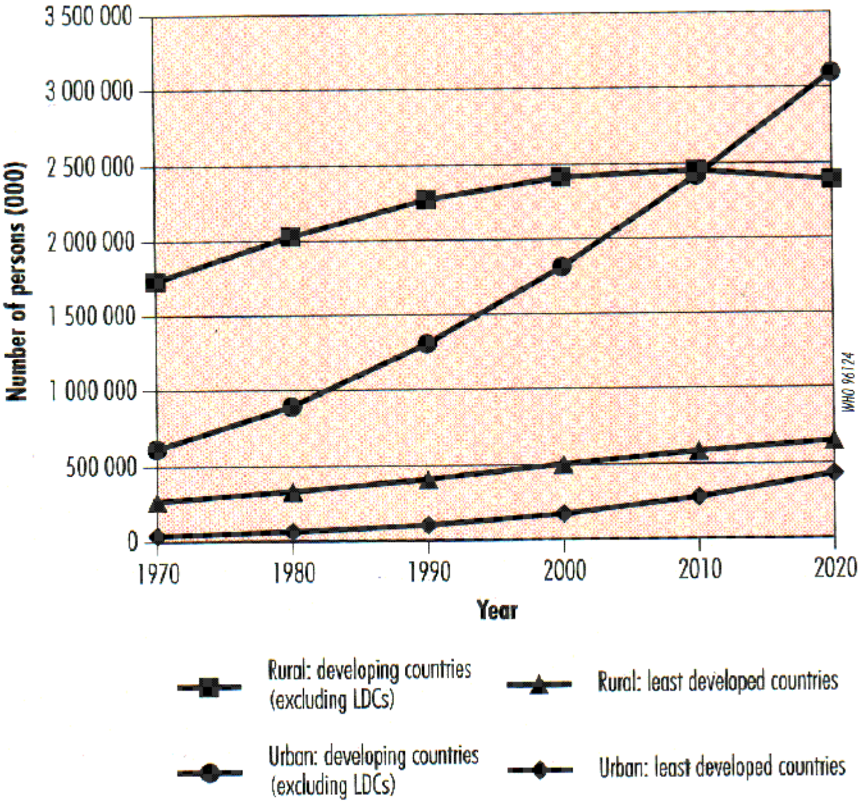
> *The heaviest burdens of ill-health will continue to fall on those who live in developing countries, especially those least able to sustain economic development.*

Urbanization

The world is becoming increasingly urbanized. By 1995, about 45% or 2.6 billion of the world's population were living in urban areas. The proportion is expected to reach 60% by the year 2025. It is expected that, by the first decade of the 21st century, the number of urban dwellers in the developing world (excluding the least developed countries) will equal and thereafter exceed the rural population; the actual number of persons in the rural areas will also begin decreasing for this group of countries (*Fig. 1*).

About 200 million people now live in cities with populations exceeding 10 million. That figure is expected to rise to 450 million in the next 20 years, almost all of the increase taking place in the developing world. In 1950, only Los Angeles and London had populations of 8 million or more; there were 20 such "megacities" in 1990 and the number is expected to reach 33 – with a combined population of more than 500 million people – by the year 2015.

Fig. 1. Urbanization, least developed and other developing countries, 1970–2020



Population growth in Asian megacities is largely fuelled by rapid economic growth, and their residents generally enjoy improved living standards. In Latin America, however, middle-class households in many cities have been experiencing declining standards of living and are moving to less expensive peripheral areas. Many of the poor, on the other hand, have moved back to city centres, and are compelled to live in substandard housing due to the inadequacy of residential public services in central city areas. For them severe overcrowding, inadequate waste disposal facilities and poor water and air quality are among the consequences. Water supply problems are among the most serious hazards.

Many cities have grown so rapidly and in such an unregulated way that their waste disposal needs, already unmet, will be very much greater in the coming decades. Some cities, particularly those in low-lying land that is vulnerable to flooding, will be at increased risk of being inundated in their own waste.

Human habitats

In the industrialized world, increasing urbanization has been accompanied by declining rates of population growth, increasing average age, smaller families and inner-city poverty. Some industrialized countries have launched long-term urban development and renewal projects aimed at improving housing, education, sanitation and other facilities. In others where this has not happened, urban decay has accelerated and adverse conditions have been the result, disproportionately affecting the poor.

In the developing world, shortage of affordable housing for the majority of low-income urban dwellers has caused a proliferation of slums and squatter settlements. Despite extensive efforts to provide decent accommodation, most developing countries find it increasingly difficult to meet the demand for housing, and have had to lower standards. At least half of the urban population of developing countries live in poor-quality housing, with slums and squatter settlements growing twice as fast as large cities.

In this context, the provision of safe and adequate drinking-water, sanitation and solid-waste disposal facilities is a major factor in reducing ill-health and suffering due to infectious diseases. Large numbers of people lack these facilities. One of the problems of providing them is that whereas "old" slums were usually located near city centres, today's "new" slums are more often in peripheral areas unsuitable for conventional development, such as swampy plains and steep hillsides.

Often services are non-existent and opportunities for connecting to city water, sewerage and power supplies are poor. Consequently, there are increased risks of waterborne and foodborne diseases, and therefore of growing poverty, for sickness means inability to work and loss of earnings.

Fertility

Women are having fewer babies. Between 1950 and 1970, women had an average of 4.7 babies. The average declined rapidly to 3.7 births by 1980; to 3.2 by 1990, and is 3 today. Increasing use of contraceptives is the main explanation; higher age at marriage has also contributed to lowering fertility rates in some countries.

The rates have not fallen uniformly worldwide. While the rate in industrialized countries is only 1.8 births, it is 3.1 births in developing countries and 5.6 in the least developed countries. The latter countries are lagging at least 20 years behind other developing nations and most of them have not even begun to see a sustainable decline in fertility.

Although the world's total fertility rate has fallen by more than a third in the last 30 years, the annual number of births has actually risen during 1980-1995 by 12% because of the increase in the number of women in the reproductive age group. Thus, in 1995 about 139 million babies were born – 16 million in the industrialized world, 25 million in the least developed countries, and 98 million in other developing countries.

About 80% of the mothers are estimated to be 20-35 years old. But there are about 15 million births to teenagers or women over 35 every year. Birth rates among young women aged 15-19 are twice as high in the developing world as in the industrialized one. However, the teenage fertility rate in North America is as high as in the developing world. Whatever the level of development of a country, the number of years of schooling seems to play a significant role in early pregnancy among women (*Table 2*).

Contraceptive practices

The rise in contraceptive use has been most spectacular in developing countries where by 1990, 53% of married couples were using a method of family planning compared to below 10%, 25 years earlier. Contraceptive practice was already 67% in the more developed regions by 1965 and reached 72% in 1990. But it was only 18% in Africa as a whole in 1990 – ranging from 31% in northern Africa to only 13% south of the Sahara. In other developing countries of Asia, Oceania, Latin America and the Caribbean, it has reached 58%, while in eastern Asia – China, Hong Kong and the Republic of Korea – it is 79%.

Globally 18% of couples resort to female sterilization and 4% to male sterilization. Female sterilization has increased in prevalence more rapidly than other methods, often accounting for almost all the recent increase in contraceptive prevalence. Worldwide, an estimated 15% of married women use the pill as their contraceptive; there is however a high prevalence of pill use among never-married women, mostly in the industrialized countries. Intrauterine devices (IUDs) account for one-fifth of the contraceptive use worldwide and condom use about 8%, mostly among men. With the advent of the AIDS

Table 2. Education and childbirth [a]

Selected countries	Percentage of women by years of schooling	
	<7	≥7
Cameroon	81	46
Kenya	70	45
Nigeria	66	27
United States	58[b]	13[c]
Guatemala	58	17
Mexico	55	18
Indonesia	52	13
Egypt	51	9
Colombia	46	19
Philippines	40	16

[a] Women aged 20–24 who had given birth by age 20, by years of schooling, latest available data

[b] < 12 years of education.

[c] ≥ 12 years of education.

Table 3. Estimated global magnitude of reproductive health concerns, worldwide, 1995

Category	Annual number[a] (millions)
Maternal deaths	0.6
Severe maternal morbidity	20
Perinatal mortality	7.6
Infants with low weight at birth	23
Unsafe abortions	20
Curable sexually transmitted diseases	333
New cases of cervical cancer	0.5
Invasive cervical cancer	*2*
Female genital mutilation	*85–110*
Couples with unmet family planning needs	*120*
Infertile couples	*60–80*

[a] Italics indicate total number.

pandemic however, condom use among single women has been increasing significantly. Other methods include hormones, vaginal barrier methods and the Norplant subdermal implant.

Life expectancy

Globally, average life expectancy at birth in 1995 was more than 65 years, an increase of more than three years since 1985. In 1995, life expectancy at birth in developed market economies was more than 77 years. It was 64 years for the developing world, and more than 52 years for the least developed countries.

The life expectancy gap between the industrialized and the developing world has narrowed to 13.3 years in 1995 from 25 years in 1955. But the gap between least developed and other developing countries has widened from 7 years to more than 13 years during the same period.

Life expectancy in Africa as a whole has increased by 4.5 years since the early 1980s, with an average of 53 years in 1995. The world's lowest life expectancy is in Sierra Leone, at only 40 years – about half that of Japan, which has the world's highest life expectancy, at 79.7 years.

Almost two-thirds of the world's population live in 48 countries, including China and India (these two accounting for 40% of the world population), where life expectancy is between 60 and 70 years. In 1995, life expectancy at birth in 121 WHO Member States was 60 years and above. Of 50 countries with expectancies lower than the health-for-all minimum target of 60 years, 37 were in Africa, and of these, 18 had a level below 50 years.

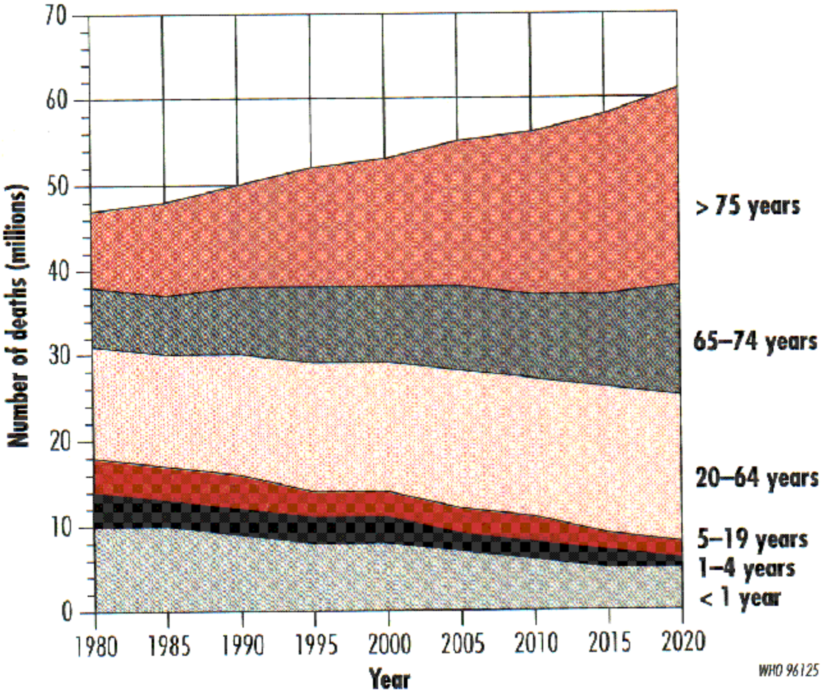
Mortality

About 52 million people died in 1995. The number is almost the same as it was 35 years ago, but the global population has almost doubled in that time. The declining death rate, from 16.5 deaths per 1 000 population in 1960 to 9.1 now, is reflected in global population growth and the increasing proportion of the elderly in developed countries. The developing world's death rate has declined sharply from 20 per 1 000 population in 1960 to about 9 in 1995, due to mortality reduction at every age but particularly in the youngest age groups. The least developed countries, with a death rate of about 14.4 per 1 000 population, lag about 25 years behind other developing nations in the decline of death rates. The rate is highest in Africa and the second highest is in Europe. The explanation is simple: low life expectancy in Africa; a very high proportion of elderly in Europe.

Sex differentials in mortality

On average, a woman living in 1995 could expect to live more than 4 years longer than a man – 67.2 versus 63 years. The female advantage is greatest in Europe – 8 more years – and smallest in South-East Asia, where it is only one year. It is three years in Africa. Africa and Latin America have the largest male excess in child mortality, and south-central and eastern Asia a higher child mortality rate for girls than for boys.

Fig. 2. Number of deaths by various age groups, 1980–2020



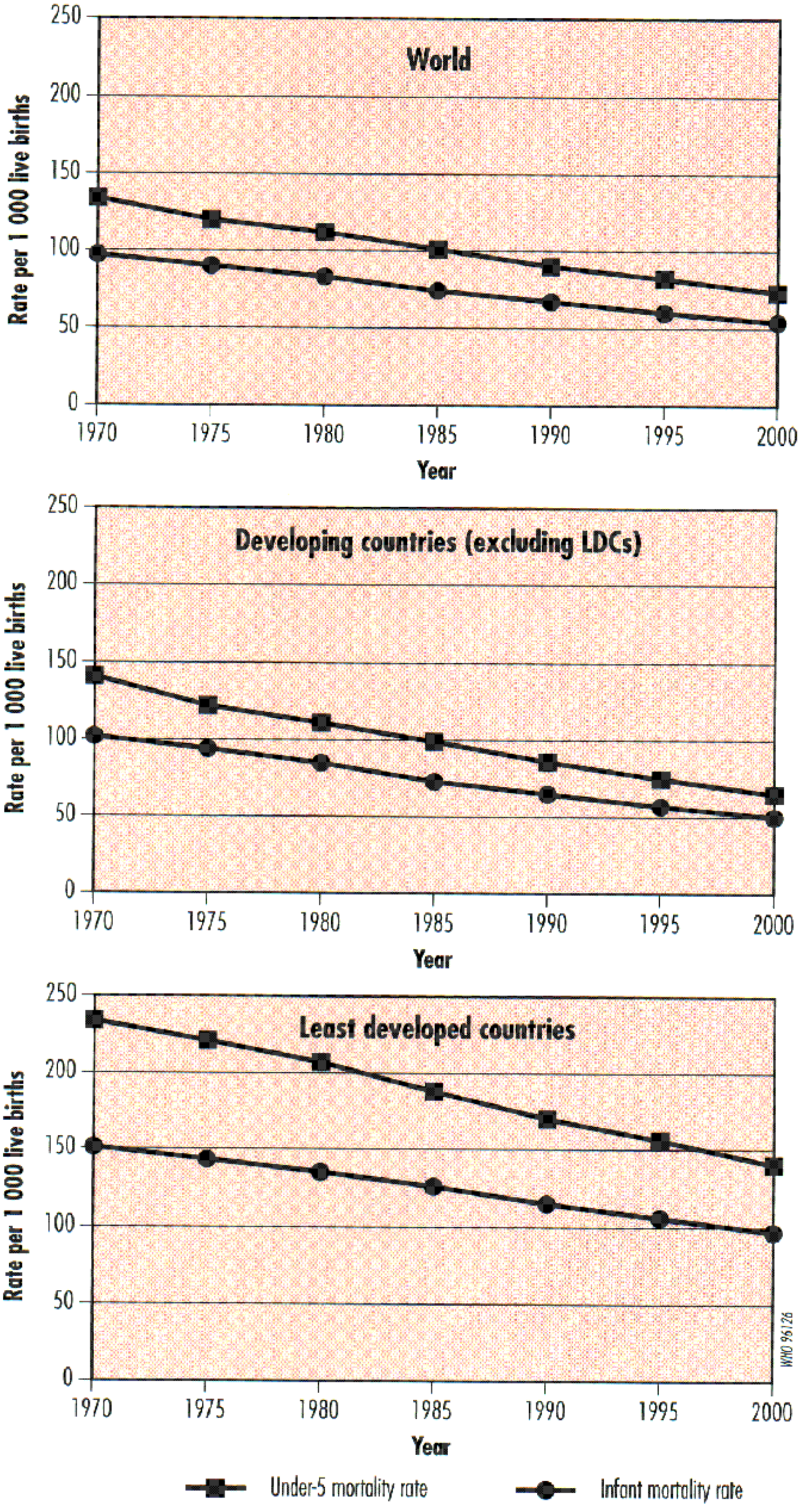
From a recent study on ***maternal mortality*** jointly carried out by WHO and UNICEF, it is estimated that globally some 585 000 maternal deaths (pregnancy-related) occur every year; that is, nearly 80 000 more deaths per year than previously reported. About 99% of these deaths occur in developing countries: 55% in Asia (which accounts for about 60% of the world's births) and 40% in Africa (which has 20% of the world's births). Developed countries, by contrast, account for 12% of births and less than 1% of total maternal deaths. The estimated burden of reproductive ill-health falling overwhelmingly on women is shown in *Table 3*. Most maternal deaths and pregnancy complications can be prevented if pregnant women have access to good-quality antenatal, delivery and postpartum care, and if certain harmful birth practices are avoided. However, less than 60% of pregnant women in developing countries have antenatal care and only about 55% of women deliver with the help of trained persons, with the quality of care received, and the effective skills of the "trained", being unknown.

Age distribution of death

About 34 million of the 52 million deaths in 1995 occurred at the extremes of life – over 11 million children died before reaching the age of 5; over 22 million died after surviving at least 65 years. In Africa, more than 40% of all deaths were among children under 5.

During 1980-1995, there were significant reductions globally in overall mortality rate but the pace of reduction has not been uniform among populations of different age groups. The decline in the number of deaths was highest (2.5 million) among children aged under 5, particularly infants, and much less for school-age children and adolescents. But deaths actually increased for the adult population aged 20-64 years (1.6 million). The worrying feature in this pattern is the anticipated increase in deaths among this adult (economically active) population group in the early 21st century (*Fig. 2*).

Fig. 3. Infant and under-5 mortality rates, 1970–2000



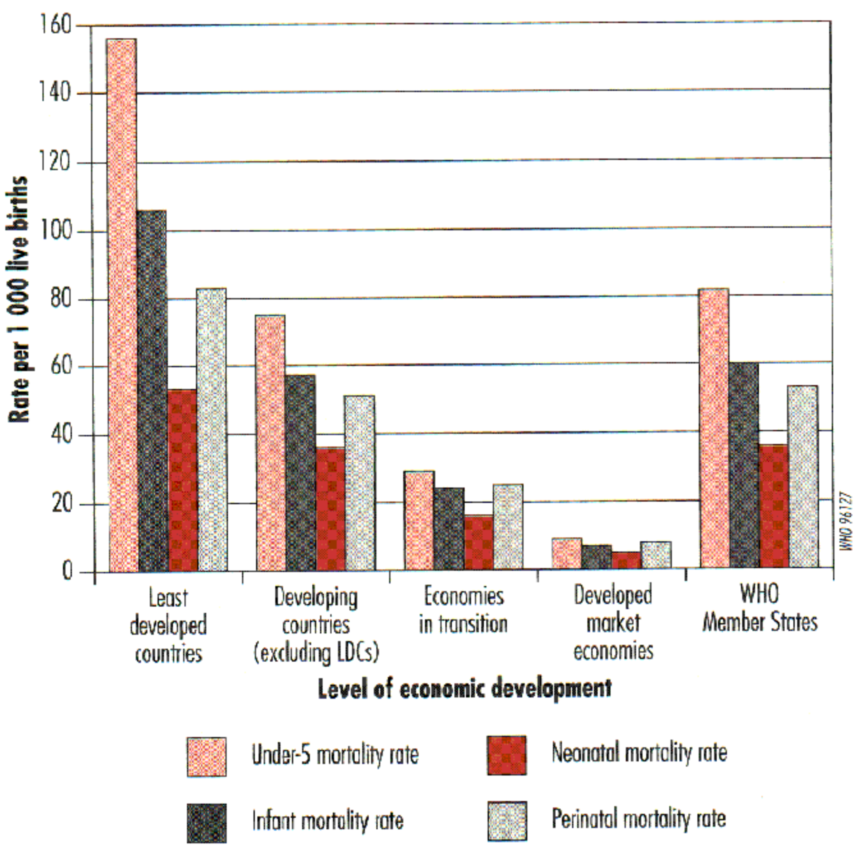
Child mortality

Child mortality is defined as death under 5 years or the probability of dying by age 5. The global average in 1995 was 81.7 per 1 000 live births. In the developed market economies, the rate was 8.5 per 1 000; in the developing world, it was 90.6 per 1 000; in the least developed countries it was 155.5 per 1 000 – 18 times higher than the low rate of an industrialized nation. Bad as that last rate is, it is not so bad as it was 40 years ago, when in the poorest countries 287 children in every 1 000 died before their fifth birthday.

Child mortality has declined significantly during the last 25 years, although the pace of decline has not been uniform among children of different ages and in different groups of countries (*Fig. 3*). Globally child mortality declined from 134 per 1 000 live births in 1970 to about 80 in 1995; that is, about 40% during the period 1970-1995. The decline was 40% for both the developed and the developing world.

Fig. 4. Economic development and deaths among children, 1995

Mortality rates per 1 000 live births



The world's ***infant mortality*** rate has fallen by more than 37% since 1970, from 97 deaths in the first year of life per 1 000 live births to 60 per 1 000 in 1995. Even so, some 8.4 million infants died last year before their first birthday. There were only 6.9 infant deaths per 1 000 live births in the most developed countries, but 106.2 per 1 000 in the least developed countries. The average in developing countries was 66.6 per 1 000. Twenty-four countries had rates higher than 100 infant deaths per 1 000; 17 of these are in Africa. The worst rates were in Sierra Leone (160), Afghanistan (159), Mali (154), Mozambique (143) and Malawi (139).

Although infant mortality declined significantly during 1970-1995, the drop was greatest for the developed market economies (66%) and lowest for the least developed countries (30%). The developed world had a much greater reduction in infant mortality compared with child mortality, while in the developing world the situation was the reverse.

WHO estimates that in 1995, there were more than 5 million ***neonatal deaths*** (deaths during the first four weeks of life) globally, or 36 deaths per 1 000 live births, most of them in developing countries. Neonatal mortality varied from 53 per 1 000 live births for the least developed countries to about 5 per 1 000 live births for the developed market economies (*Fig. 4*). About 70% of infant deaths were neonatal deaths in the developed world – developed market economies and economies in transition – but only 50% in the least developed countries.

The global value for ***perinatal mortality*** (deaths during late pregnancy or the first week of life) was 53 per 1 000 live births in 1995 and varied from 83 per 1 000 in the least developed countries to 8 for the developed market economies. Overall in developing countries it is estimated that in 1995, about 30% (3.3 million) of total deaths among children under 5 occurred among newborns within a week after birth, about 45% (5 million) among neonates and 73% (8.2 million) among infants aged less than 1 year.

Causes of death and disease

About 17 million of the 52 million deaths a year are classified as due to infectious diseases of major significance.

Most deaths due to infectious diseases occur in Africa and South-East Asia, and a small proportion in the Americas and Europe.

Of more than 11 million deaths among children under age 5 in the developing world, about 9 million have been attributed to infectious diseases, about 25% preventable by immunization. In respect of infant deaths, 60% (5 million) of the total of 8.2 million were due to infectious diseases, while about 36% (1.8 million) of neonatal deaths have been attributed to infections.

Among adults aged 15-59 years, infectious diseases appear to be responsible for 20% of deaths (2.5 million).

Control of infectious diseases

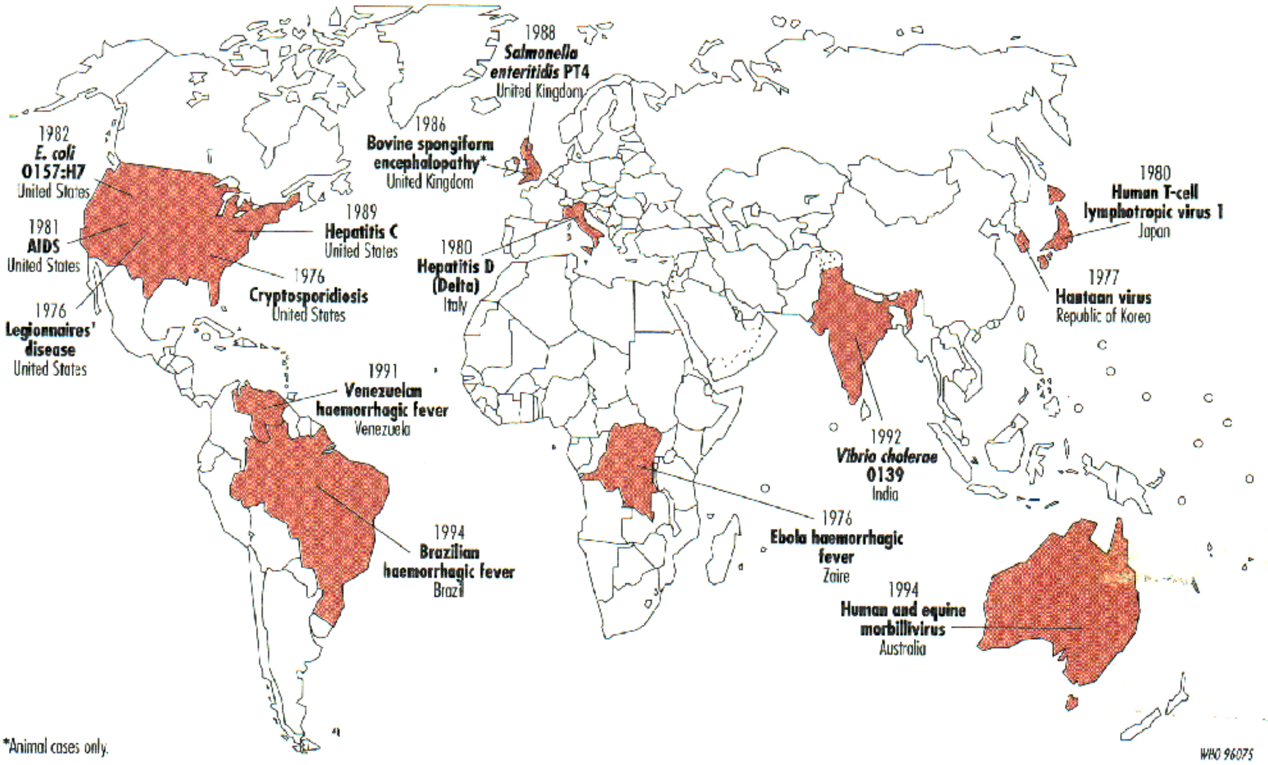
Emerging diseases

During the past 20 years, at least 30 new diseases have emerged to threaten the health of hundreds of millions of people. For many of these diseases there is no treatment, cure or vaccine and the possibility of preventing or controlling them is limited.

Emerging infectious diseases are those whose incidence in humans has increased during the last two decades or which threatens to increase in the near future. The term also refers to newly-appearing infectious diseases, or diseases that are spreading to new geographical areas – such as cholera in South America and yellow fever in Kenya. It refers also to diseases that were easily controlled by chemotherapy and antibiotics, but which have developed antimicrobial resistance (*Map 2*).

The diseases in question involve all the major modes of transmission – they are spread either from person to person,

Map 2. New infectious diseases in humans and animals since 1976
Countries where cases first appeared or were first identified



*Animal cases only.

WHO 96075

by insects or animals, or through contaminated water or food. Examples of diseases – whether "new" or "old" – in each of these modes are examined later in this chapter.

The most dramatic example of a new disease is AIDS, caused by the human immunodeficiency virus (HIV). The existence of the virus was unknown until 15 years ago, but it has since then infected an estimated 24 million adults worldwide, and that number could grow to a cumulative total of 40 million by the year 2000.

The origins of HIV are unknown, but it is related to viruses which cause AIDS-like illness in monkeys. Microorganisms constantly undergo changes that enable them to cope with an increasingly hostile environment in their hosts. For example, HIV exploits weaknesses in the host's defences by damaging the human immune system, thereby allowing other "opportunistic" infections to take advantage.

A new breed of deadly haemorrhagic fevers, of which Ebola is the most notorious, has struck in Africa, Asia, the United States and Latin America. Ebola appeared for the first time in Zaire and Sudan in 1976; it has since struck in Côte d'Ivoire in 1994 and 1995, Liberia in 1995 and again in Zaire in 1995, where it was fatal in 77% of cases. The natural carrier of the Ebola virus – presumably an animal – has not been identified (*Box 4*).

The United States has seen the emergence of hantavirus pulmonary syndrome, characterized by respiratory failure and a case fatality rate of over 50%. Since it was first recognized in 1993, this type of hantavirus infection has been detected in more than 20 states in that country, and has also surfaced in Argentina and Brazil. This hantavirus is carried by rodents, particularly deer mice, and other hantaviruses have been recognized for many years in Asia, where they cause haemorrhagic fever with renal involvement in humans.

Epidemics of foodborne and waterborne diseases due to new organisms such as cryptosporidium or new strains of bacteria such as *Escherichia coli* have hit industrialized and developing countries alike. The O157:H7 strain of *E.coli* was first reported in 1982 and has since then been implicated in many serious outbreaks of diarrhoeal illness, sometimes leading to kidney failure. The strain has been linked to undercooked hamburger beef and unpasteurized milk.

A completely new strain of cholera, 0139, appeared in south-eastern India in 1992 and has since spread north and west to other areas of India, into western China, Thailand and other parts of South-East Asia.

The threat of a new global influenza pandemic is increasing. Major shifts in

Box 4. The Ebola epidemic: a model for rapid response

The epidemic of Ebola haemorrhagic fever in Zaire in mid-1995 focused international attention on emerging diseases to an almost unprecedented degree, even though the number of people affected – 316 cases including 245 deaths – was tiny compared to many other infectious diseases.

The intense public and media interest in Ebola haemorrhagic fever was stirred by its deadliness – the epidemic had a 77% mortality rate – its infectiousness and its dreadful symptoms. The average age of those who died was 35 years; patients ranged from a three-day-old baby to a 71-year-old man. Many of the victims were health care workers. Despite fears that the disease might spread to other parts of the world, the epidemic was confined to a relatively small corner of Zaire.

This was due largely to the rapid national and international response to the outbreak. Staff from WHO's headquarters in Geneva and regional office in Brazzaville, Congo, arrived at the site of the epidemic within 24 hours of notification in Geneva. At the same time, diagnosis of the disease was confirmed at the WHO Collaborating Centre on Arboviruses and Viral Haemorrhagic Fevers, at the Centers for Disease Control and Prevention, in Atlanta, Georgia, USA.

By arriving promptly, WHO experts and their Zairian public health counterparts were able to set up a disease detection system and train medical students in its operation so that all cases could be found and isolated. As international partners in outbreak investigation and control arrived, WHO's role became one of ensuring synergism among those partners, providing logistics support, and identifying and ensuring essential intra-epidemic research. An International Scientific and Technical Committee, established in Zaire by the Zairian health ministry and WHO, directed the epidemic control operations and set up a follow-up surveillance system. Research was launched in an effort to identify the natural host of the Ebola virus.

This and other recent outbreaks of infectious diseases highlight a weakened ability to detect and contain such threats at a national, regional or global level. One lesson learned was that WHO can, and must, play a proactive role to support national efforts to control outbreaks. The Organization has therefore established a new rapid response system including teams of experts and supplies from regional offices, with headquarters support, to be available for immediate field operations at 24 hour's notice.

the make-up of influenza viruses occur every 20 years or so, triggering large epidemics in many parts of the world, and causing many thousands of deaths. The next such shift is expected to take place very soon.

Epidemic strains of influenza viruses originate from China. The influenza virus is carried by ducks, chickens and pigs raised in close proximity to one another on farms. The exchange of genetic material between these viruses produces new strains, leading to epidemics of human influenza, each epidemic being due to a different strain.

New strains such as those of cholera and influenza do not follow the usual pattern of being more common in younger people. They affect all age groups, since older people have not acquired immunity to them from previous infection.

The emergence of drug-resistant strains of microorganisms or parasites is promoted by treatments that do not result in cure. The increasing use of antimicrobials worldwide, often in subtherapeutic doses and sometimes in counterfeit form, guarantees that this problem will increase in the foreseeable future, as mentioned in later sections of this report.

Changes in lifestyle, behaviour (including injecting and non-injecting drug use) and cultural or social values are behind the emergence of some infectious diseases such as syphilis. Increases in the number of sexual partners have been the main factor in the spread of HIV infection and other sexually transmitted diseases.

Travel, including tourism, also plays a role. The spread of syphilis in the 18th and 19th centuries was related to the movement of armies. Today, the introduction of HIV in many parts of the world is due to greatly increased human mobility. Studies show that whereas only a few generations ago most people in their lifetime travelled no further than 40 kilometres from their birthplace, many today go up to 1 000 times further, travelling the whole world.

The practices of modern medicine also contribute. The spread of viral hepatitis is related in part to techniques such as kidney dialysis and multiple blood transfusions, as well as to other forms of transmission.

Relaxation in immunization practices can quickly result in the resurgence of diseases, as, for example, the recent spread of diphtheria in the Russian Federation and other former republics of the USSR.

New animal diseases pose potential foodborne risks to human health that are sometimes difficult to evaluate or predict. An example that has caused much public concern in Europe is bovine spongiform encephalopathy ("mad cow disease"). Fears have grown that the infectious agent responsible may be passed through the food chain to cause a variant of the incurable Creutzfeldt-Jakob disease in humans, in which the brain is attacked. The British beef market has been seriously affected and stringent public health safeguards have been introduced.

The reasons for outbreaks of new diseases, or sharp increases in those once believed to be under control, are complex and still not fully understood. The fact is however that national health has become an international challenge. An outbreak anywhere must now be seen as a threat to virtually all countries, especially those that serve as major hubs of international travel (*Map 3*).

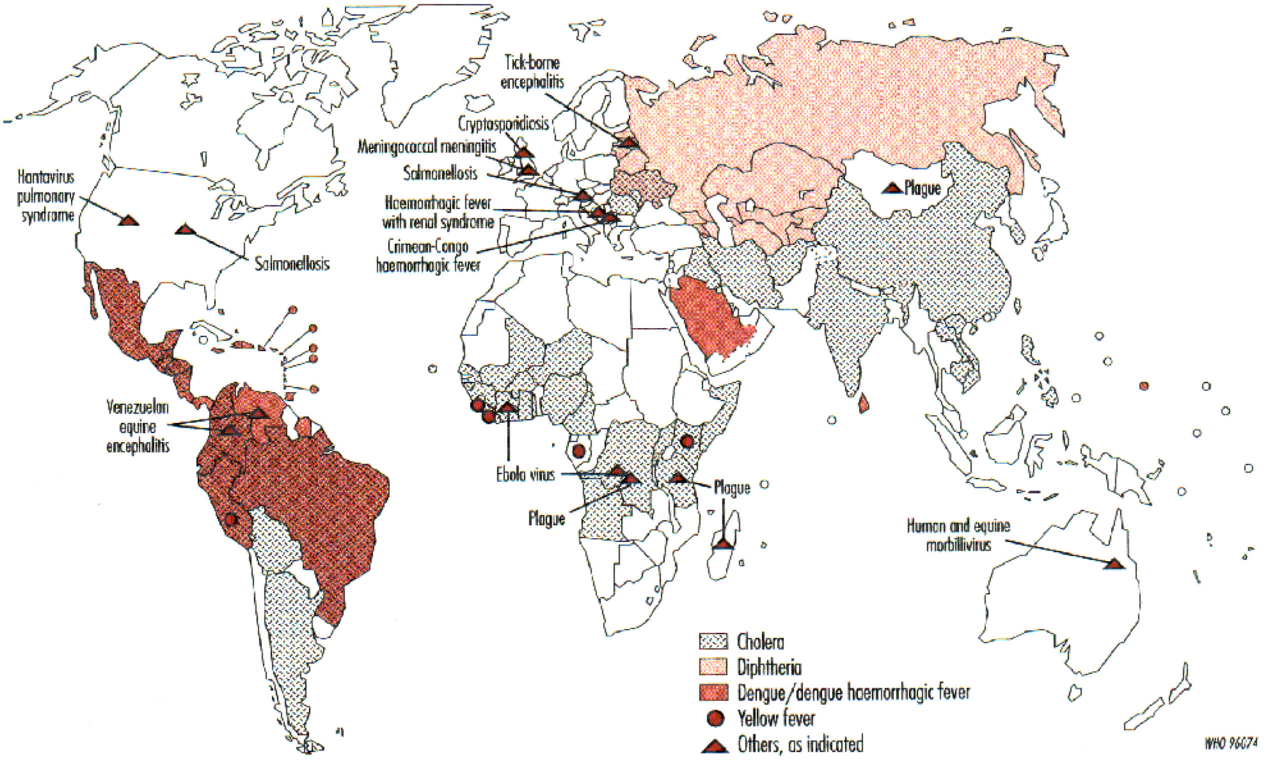
Despite the emergence of new diseases in the last 20 years, there is still a lack of national and international political will and resources to develop and support the systems that are necessary to detect them and stop their spread. Without doubt diseases as yet unknown, but with the potential to be the AIDS of tomorrow, lurk in the shadows.

An outbreak anywhere must now be seen as a threat to virtually all countries, especially those that serve as major hubs of international travel.

Responding to epidemics

The process of response encompasses a multitude of activities including: diagnosis of the disease; investigation to understand the source of transmission; implementation of control strategies and programmes; research to develop adequate means to treat the disease and prevent its spread; and the production and distribution of the necessary drugs and vaccines.

Map 3. Selected emerging and re-emerging disease outbreaks in 1995


Tick-borne encephalitis
Cryptosporidiosis
Meningococcal meningitis
Salmonellosis
Hantavirus pulmonary syndrome
Haemorrhagic fever with renal syndrome
Crimean-Congo haemorrhagic fever
Salmonellosis
Plague
Venezuelan equine encephalitis
Ebola virus
Plague
Plague
Human and equine morbillivirus
▨ Cholera
▨ Diphtheria
▨ Dengue/dengue haemorrhagic fever
● Yellow fever
▲ Others, as indicated
WHO 96074

The first step is to establish mechanisms and procedures for the surveillance of infectious diseases so that national authorities can be alerted to outbreaks and epidemics and advised on how best to deal with them.

An international network of collaborating centres is being set up and their activities coordinated by WHO, to help ensure that changing disease conditions are rapidly recognized.

Antimicrobial resistance

Resistance by disease-causing organisms to antimicrobial drugs and other agents is a major public health problem worldwide. It is making a growing number of infections virtually untreatable, both in hospitals (as discussed in the later section on hospital infections) and in the general community. It is having a deadly impact on the control of diseases such as tuberculosis, malaria, cholera, dysentery and pneumonia, all of which are discussed in more detail later in this chapter.

Antimicrobial resistance is not a new problem, but it has worsened dramatically in the last decade. During that time, the pace of development of new antimicrobials has slowed down while the prevalence of resistance has grown at an alarming rate. The increase in the number of drug-resistant bacteria is no longer matched by a parallel expansion in the arsenal of agents used to treat infections.

In this situation, doctors and their patients are more and more helpless. All age groups are affected. The elderly, the very young, the chronically ill and people whose natural defences are weakened by disease or medical treatment such as surgery are at greater risk of drug-resistant infections, but healthy people in the prime of life can also be attacked. Resistance to antibiotics and other drugs means that people with infections are ill for longer periods, and are at greater risk of dying, and that disease epidemics are prolonged.

All bacteria possess an inherent flexibility that enables them, sooner or later, to evolve genes that render them resistant to any antimicrobial. By killing susceptible bacteria, an antimicrobial provides selective pressures that favour overgrowth of bacteria carrying a gene that confers resistance. The continuous use of antimicrobial agents encourages the multiplication and spread of resistant strains.

There is strong evidence that a major cause of the current crisis in antimicrobial resistance is the uncontrolled and inappropriate use of antibiotic drugs, in both industrialized and developing countries. They are used by too many people to treat the wrong kind of infection, in the wrong dosage and for the wrong period of time.

The implications are awesome: drugs that cost tens of millions of dollars to produce, and take perhaps 10 years to reach the market, have only a limited life span in which they are effective. As resistance spreads, that life span shrinks; as fewer new drugs appear, the gulf widens between infection and control. So far, the pattern of excessive or inappropriate use and the development of resistance has been repeated after the introduction of each new antimicrobial.

The overuse of expensive drugs designed to cover a range of infections is a particularly serious problem in industrialized countries. In developing countries, the problem is compounded by the ready availability of over-the-counter drugs. This allows patients to treat themselves, either with the wrong medicine, or in quantities that are too small to be effective. Substandard and counterfeit drugs which lack adequate amounts of active ingredients further exacerbate the resistance problem.

Resistance has no natural barriers; its development in the most remote locations can lead rapidly to a worldwide impact, aided by international air travel.

Furthermore, enormous amounts of medical antimicrobials are used for the production of animal food around the world. Some 170 billion tons of animal meat are produced worldwide every year. More than half the total production of all antimicrobials is used in farm animals, either for disease prevention or for growth promotion. Drug-resistant bacteria are passed through the food chain to the consumer, where they may cause disease or transfer the resistance to human pathogens.

Examples of bacterial resistance

Enterococci contribute to some of the most common infections acquired in hospitals, causing intra-abdominal abscesses, endocarditis, and infections of the urinary tract and soft tissues. In some countries, infections resulting from strains resistant to the main groups of antibiotics, such as the beta-lactams and the aminoglycosides, can only be treated with vancomycin, an expensive intravenous drug. Even resistance to vancomycin has developed in the last 10 years or so. In the United States in 1994, 14% of enterococci isolated from patients in intensive care units were resistant to vancomycin.

Staphylococci, which can contribute to skin infections, endocarditis, osteomyelitis, food poisoning and other serious disorders, have developed resistance to all antibiotics except vancomycin. If vancomycin-resistant strains were to emerge, some of the most prevalent hospital-acquired infections would become virtually untreatable (see also the section on hospital infections, below).

Streptococci have become increasingly resistant to some antibiotics in the last 25 years. They are among the most common disease-causing bacteria, responsible for infections of the throat, middle ear, skin and wounds, and also necrotizing fasciitis and gangrene.

Pneumococci and *Haemophilus influenzae* are the most common bacteria causing acute respiratory infections in children, particularly pneumonia. Both of these organisms are becoming more and more resistant to drugs. Strains of pneumococci, once uniformly susceptible to penicillin, are currently resistant to it in up to 18% of cases in the United States and 40% in South Africa. In addition, they are becoming resistant to many other commonly used antibiotics, including cotrimoxazole, the drug recommended by WHO for treatment of pneumonia. The most virulent type of *Haemophilus influenzae* is today frequently resistant to ampicillin, and

Resistance has no natural barriers; its development in the most remote locations can lead rapidly to a worldwide impact, aided by international air travel.

strains have been identified that are resistant to other drugs, including cotrimoxazole. In brief, doctors worldwide are losing some of the most useful and affordable antibiotics against the two bacteria which are the major cause of death in children.

Neisseria gonorrhoeae, cause of one of the most common sexually transmitted diseases, has acquired such resistance to penicillin and tetracyclines in most countries that the use of these antibiotics to treat it has become unacceptable and this infection now requires the use of much more expensive drugs which are often unavailable.

Shigella dysenteriae has been causing outbreaks of severe diarrhoeal disease in central and southern Africa in recent years, including those in refugee camps, with the epidemic strain acquiring increasing resistance to standard antibiotics. Epidemic dysentery caused by this strain results in the death of up to 15% of those infected.

Salmonella typhi, the bacterium responsible for typhoid fever, has developed resistance to antibiotics commonly used in the past for treatment. Resistant strains have caused outbreaks of the disease in India and Pakistan in recent years. Without effective antibiotic treatment, typhoid fever kills almost 10% of those infected. In South-East Asia, 50% or more of the strains of the bacteria may already be resistant to several antibiotics.

Doctors worldwide are losing some of the most useful and affordable antibiotics against the two bacteria which are the major cause of death in children.

More than half of the antibiotics produced worldwide are used in animals, largely in subtherapeutic concentrations which favour the onset of drug resistance. As a result, two important human pathogens of animal origin, *E. coli* and salmonellae, are today highly resistant to antibiotics in both industrialized and developing countries. For instance, in the United Kingdom, the increase of multidrug-resistant strains of *Salmonella typhimurium* isolated from cattle is paralleled by increasing resistance among strains of human origin. In Thailand, salmonellae isolated from food animals are also highly resistant to the common antibiotics. These bacteria cause diarrhoeal disease and can lead to life-threatening complications. Due to the globalization of food supply and international travel, antimicrobial resistance among animal bacteria can affect consumers anywhere in the world.

Strains of *M. tuberculosis* resistant to antituberculosis drugs are widespread, although attention has recently focused on the alarming outbreaks of tuberculosis caused by multidrug-resistant strains in the United States. Drug resistance is the result of poor prescribing practices, or poor patient compliance with treatment. It is low in the few countries with effective tuberculosis programmes. The most dangerous form of the multidrug-resistant disease occurs when cases become virtually incurable and doctors face situations similar to those of the pre-antibiotic era.

Malaria presents a double resistance problem: resistance of the *Plasmodium* parasites, which cause the disease, to antimalarial drugs; and resistance of the *Anopheles* mosquitos, the vectors of the disease, to insecticides. The arsenal of antimalarial drugs is limited. Most of them act by killing parasites when they are multiplying in the blood stream of the human host. Unfortunately, due to inadequate regimens, poor drug supply, and poor quality and misuse of drugs, rapid development of drug resistance has occurred in most areas of the world. Drug resistance is particularly important in falciparum malaria, the most severe form of the disease. Resistance to chloroquine, the most commonly used drug, has been found in all endemic countries except those of central America and the Caribbean. Resistance to multiple drugs is common in South-East Asia.

This serious obstacle to malaria control efforts is further complicated by mosquito resistance to insecticides. Many mosquitos are reported to be resistant to the three classes of insecticides available for public health use, and some are becoming resistant to pyrethroids, widely promoted for bednet and curtain impregnation.

Outlook

The next few years are certain to be critical for the future of antimicrobial drugs. Antimicrobial resistance will increase if present trends continue. Doctors in many parts of the world could find themselves resorting to methods that date back to before the antibiotic era. For instance, in New York city patients with multidrug-resistant tuberculosis who will not voluntarily comply with recommended treatment are sometimes isolated on a former prison island, used much as sanatoria were used in the past.

Disease control strategies will be seriously threatened by mounting drug resistance levels among bacteria which cause the most important and frequent diseases worldwide. Developing countries, where the burden of infectious diseases is the highest, will be facing the impossible task of controlling diseases with only scarce expensive drugs which will not be affordable for all sick persons.

Box 5 illustrates WHO's work on surveillance of bacterial resistance to antimicrobial agents.

Rational use of drugs

Controlling resistance poses a substantial challenge. The use of an increasing array of vaccines to prevent infections rather than risking resistance by treating them, will be helpful for some diseases. More appropriate use of drugs by doctors and patients is essential to slow the emergence of resistance. For this reason, WHO is taking several steps to encourage more appropriate use.

In the Model List of essential drugs published by WHO in 1989, a separate section on so-called "reserve antimicrobials" and monitoring resistance was introduced. However, this concept is of practical relevance only if certain conditions are met: all prescribers should have access to guidelines on the rational use of drugs and to information on drug susceptibility patterns of common microorganisms; antimicrobials should be of proven quality; and appropriate regulations should be in place concerning drug promotion and accessibility.

If the availability of innovative products to populations in need is to be ensured, there must be a reassessment

Box 5. WHO networks for drug resistance surveillance

WHONET is an information system developed to support WHO's global surveillance of bacterial resistance to antimicrobial agents. Every year, tens of thousands of laboratories in medical centres around the world test the susceptibility of patients to antimicrobial agents. The test results reflect the frequency and spread of antimicrobial resistance in each centre and worldwide. These results are, however, kept in paper files which are too laborious to analyse or in computer files with different formats. WHONET puts the susceptibility test results into a universal file format, and gives health workers a user-friendly software to monitor and manage the quality of tests and the spread of resistance. WHONET also enables the centres to merge their files easily and to form aggregate databases for collaborative regional, national and global surveillance of the spread of antimicrobial resistance. By end 1995, 177 laboratories in 31 countries or areas were participating in WHONET.

At local level. WHONET helps select appropriate antibiotics for individual patients, identify locally endemic resistant strains and support local practices.

At national level. WHONET guides antibiotic usage policy, and facilitates the use of alternative agents and the revision of national strategies.

At global level. WHONET guides the development and use of new antibiotics, studies ways of preserving the efficacy of older ones, and detects emerging resistant strains.

Another special-purpose surveillance system, the Global Project of Antituberculosis Drug Resistance Surveillance set up by WHO and the International Union against Tuberculosis and Lung Disease (IUATLD) tackles the emergence of strains of *M. tuberculosis* resistant to antimycobacterial agents. Dramatic outbreaks have recently been caused by the chronic neglect of tuberculosis control, which has resulted in delayed diagnoses, inadequate treatment regimens, high mortality and nosocomial transmission.

The objectives of global antituberculosis drug resistance surveillance are:

- to collect data on the extent and severity of antituberculosis drug resistance in a standardized manner at country level worldwide;
- to monitor drug resistance levels in countries identified by WHO as priority for assistance or in countries where knowledge of drug resistance levels may be important for global policy decisions;
- to help countries in developing a surveillance system which provides representative data, and improve the diagnostic capacity of laboratories.

In late 1994 WHO took the lead by publishing guidelines together with IUATLD, establishing a global network of reputable laboratories (20 as of early 1996) and creating a working group which includes most of the experts on drug resistance worldwide. Every 6-8 months these "supranational" reference laboratories conduct tests to ensure that results obtained in different settings are standardized and comparable internationally. They also assist national reference laboratories in setting up surveillance systems within countries, and control the quality of results. Finally, WHO has developed and made available free of charge a simple user-friendly software for data collection and analysis.

Forty-three (mostly countrywide) projects are ongoing or planned for 1996 in 42 countries or territories so that several countries worldwide should be able to provide reliable, uniform and comparable data by early 1997, when a global report will be prepared and distributed.

of how the future development of antimicrobials in particular can be geared to public health requirements. Infectious diseases remain the foremost cause of death worldwide; yet the acknowledged priorities of the developing world remain largely unsatisfied.

WHO has been collaborating for some 20 years with governments, research institutions, other agencies and the pharmaceutical industry to ensure that treatments are made available for diseases which are prevalent in developing countries.

Hospital infections

Infections are most common in intensive care units and acute surgical and orthopaedic wards.

Hospitals are intended to heal the sick, but they are also sources of infection. Ironically, advances in medicine are partly responsible for the fact that today, hospital infections are a leading cause of death in some parts of the world.

At any one time, many millions of people in the world suffer from infectious complications acquired in hospital. About 2 million such cases occur every year in the United States alone, including about 70 000 related deaths. The spread of these infections is a growing threat to both patients and health care workers. It also imposes huge economic costs – up to $10 billion a year in the United States, $ 450 million in Mexico, and $ 40 million in Thailand.

WHO studies have shown the highest frequencies of hospital infections in the Eastern Mediterranean and South-East Asia regions, followed by the Western Pacific and Europe. In Mexico, hospital infections (also known as nosocomial infections) take third place in the list of major causes of death, after intestinal infections and pneumonia, but before ischaemic heart disease and diabetes.

Infections are most common in intensive care units and acute surgical and orthopaedic wards. The most frequent are surgical wound infections, which represent 25% of all hospital infections. Urinary tract and lower respiratory tract infections each account for more than 20% of the total. The infections range from trivial to life-threatening conditions such as septicaemia (blood poisoning).

The problem is getting ever more serious, largely because of increasing microbial resistance to drugs used to treat even the most common infections (see also the section on antimicrobial resistance, above). Antibiotic-resistant bacteria are responsible for up to 60% of hospital-acquired infections in the United States.

Some organisms are resistant to at least one drug and often as many as 10. This is leading to the use of much more expensive drugs, more prolonged hospitalizations, higher death rates and higher health costs.

Antibiotic resistance in hospitals dates back to at least 1950, when penicillin-resistant staphylococci became common. By the early 1980s, many hospitals had also begun to detect methicillin-resistant *Staphylococcus aureus* infections, which cause wound infections and pneumonia, and which remain a problem. In many cases they are treatable only with vancomycin, an antibiotic that is increasingly regarded as the last defence. But if methicillin-resistant bacteria also became resistant to this drug, many life-threatening infections would be untreatable, and hospital outbreaks involving these strains would be very difficult to contain. More recently, multidrug-resistant strains of the tuberculosis organism have appeared in hospitals, especially among patients with HIV infection. Some of these strains are resistant to as many as seven of the standard tuberculosis drugs.

Patients receiving treatment in hospital are likely to have lowered natural resistance to infection. In industrialized countries with modern, well-equipped hospitals, other reasons for the rise of infections include the growing number of surgical and medical procedures and invasive techniques which create many routes of infection. In poorer countries, hospitals may lack the equipment or the trained staff to reduce infections.

All hospitals should introduce infection control policies. Their success depends on such aspects as careful training in good hygienic practice; the provision of isolation facilities; high standards in sterilization, disinfection, cleaning and waste disposal; and the provision of guidelines for doctors and other health staff on the use of drugs to reduce or prevent antibiotic resistance.

Infectious diseases according to mode of transmission

New approaches to disease prevention and control are needed which focus on breaking transmission chains and on ecological approaches that facilitate the participation of local and global communities and non-health agencies. This section examines infectious diseases grouped according to their mode of transmission (*Table 4*, *Fig. 5*). Although each disease can have more than one mode of spread, only the **main** mode of transmission is considered here. Even the relative importance of the various modes of transmission of the agent may vary from one environment to another. The polioviruses, for example, are transmitted by the faecal-oral route in communities with poor sanitation, while in communities with good sanitation, their transmission by droplet becomes more important. The same is true for hepatitis B, which can be transmitted through exposure to infective body fluids such as may occur during sexual intercourse; through the use of needles and other intravenous or surgical instruments contaminated with blood; or from mother to child during birth.

Infectious diseases spread from the reservoir of infection to the susceptible host in a chain sometimes called a cycle of infection, which involves three main links: the agent, the environment and the susceptible host. The following sections illustrate ways of breaking this chain, using as examples a number of diseases considered to be of global or, in some instances, of significant regional concern (shown in *Table 1*).

Person-to-person transmission

In today's overcrowded world, the risks of diseases spreading from person to person are increasing rapidly. The main danger zones are the densely-populated slums of the largest cities where infections flourish. But today all cities are interconnected. Every day, scores of thousands of people cross the globe from one city to another in less time than it takes many diseases to incubate. Many of these travellers get infected in one country and fall ill – and infect others – in a different country.

The combination of population growth (especially in cities), international air travel, incessant migration and the ebb and flow of refugees, means that the peoples of the world are more intermingled now than at any time in history. Thus, human transmission could become the predominant way in which diseases are spread quickly, not just from person to person but from continent to continent.

Ominous trends confront us. The global spread of HIV, hepatitis B and other sexually transmitted diseases, the international resurgence of tuberculosis, and outbreaks of diphtheria – all transmitted from person to person – illustrate the growing threats from infectious disease.

Many millions of people die every year and hundreds of millions fall ill as a result of human transmission of disease. Many diseases can be spread in more than one way, but usually one mode predominates. The modes include airborne and droplet spread; sexual transmission; bloodborne transmission and direct contact.

Airborne and droplet transmission

All the diseases that are spread primarily through this route exploit enclosed spaces, crowding and poor hygienic conditions. These are precisely the living conditions of about half the inhabitants of cities in the developing world. They exist also in the poorest inner-city areas of many industrialized countries.

Children are predominantly affected by most of the major diseases in question – measles, pertussis (whooping cough) and other acute respiratory infections, meningococcal meningitis and diphtheria. These diseases claim the

Fig. 5. Deaths due to selected infectious diseases, 1995 estimates

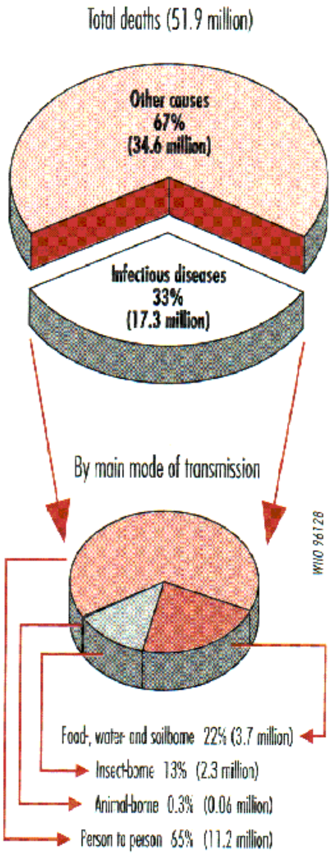


Table 4. Global health situation: mortality, morbidity and disability, selected infectious diseases of global and regional concern, all ages, 1995 estimates

	Number (000)			
		Cases		
Selected infectious diseases by main mode of transmission	**Deaths**	**New (incidence)**	**All (prevalence)**	**Disabled persons (permanent and long-term)**
Person to person				
Acute lower respiratory infection (ALRI)[a]	4 416	394 750[b]	...	...
Tuberculosis	3 072	8 888	22 000	...
Hepatitis B, viral	1 156	4 149	350 000[c]	...
Measles	1 066	...	42 000	5 590
AIDS	1 063	1 125	1 538	...
Whooping cough (pertussis)	355	...	40 000	...
Meningococcal meningitis	35	350	...	45
Poliomyelitis, acute	9	...	82	85
Leprosy	2	561	1 833	3 000
Sexually transmitted diseases				
Gonorrhoea	...	62 000	...	...
Syphilis, venereal	...	12 000	...	...
Chancroid	...	7 000	...	...
Trachoma	...	20 540	153 832	5 583
Diphtheria[d]	...	...	35	...
Food-, water- and soilborne				
Diarrhoea[e]	3 115	4 002 000[b]	...	...
Neonatal tetanus	459	...	...	...
Hookworm diseases	65	...	151 000	...
Ascariasis	60	...	250 000	...
Schistosomiasis	20	...	200 000	...
Cholera[d]	11	384	...	...
Trichuriasis	10	...	45 530	...
Trematode infections (foodborne only)	10	...	40 000	...
Dracunculiasis (guinea-worm infection)	...	122	122	...
Insect-borne				
Malaria	2 100	300 000–500 000	...	...
Leishmaniasis	80	1 750	12 000	...
Onchocerciasis (river blindness)	47	...	18 000	360
Chagas disease (American trypanosomiasis)	45	800	18 000	...
Dengue/dengue haemorrhagic fever	24	592	...	...
Sleeping sickness (African trypanosomiasis)	20	...	300	...
Japanese encephalitis	11	43	...	9
Plague[d]	0.2	2	...	...
Yellow fever[d]	0.2	0.5	...	...
Filariasis (lymphatic)	...	...	120 000	43 000
Animal-borne				
Rabies (dog-mediated)	60	...	...	...
Selected infectious diseases (total)	**17 312**	...	...	...
ALL CAUSES	**51 882**	...	...	...

[a] Figures do not include lower respiratory infections related to measles, pertussis and HIV infections.

[b] Incidence figure refers to episodes.

[c] Chronic HBV carriers.

[d] Officially reported figures only.

[e] Figures relate to acute watery diarrhoea, persistent diarrhoea and dysentery, but do not include measles- and HIV-related diarrhoea.

... Data not available or not applicable.

lives of more than 4 million children a year. Adults are also affected by acute respiratory infections, the best example being influenza, which is estimated to kill 1 million adults a year.

Acute lower respiratory infections, of which pneumonia is the most deadly, kill more than 4 million people a year, most of them the under-5s. They are the leading cause of death in that age group, and 99% of deaths occur in developing countries.

Pneumonia, especially pneumococcal pneumonia, is the chief culprit. The causative agent, *Streptococcus pneumoniae*, is carried in the noses and throats of healthy people worldwide, but infants and young children have little resistance to it, or to *Haemophilus influenzae*, the second most frequent bacterial cause of childhood pneumonia in developing countries. Young children whose health is already weakened by low birth weight, malnutrition or other infections, are more vulnerable to infection and have high case-fatality rates. Spread by droplets in the air, these acute bacterial infections of the lungs typically begin with the sudden onset of shaking chills and fever. In infants, vomiting and convulsions may be the first symptoms. The incubation period is only a few days at most.

Millions of these children are dying – at the rate of one every few seconds – when theoretically the lives of most of them could be saved for a few cents each. The bacterial infections can be treated by antibiotics given orally for five days, at an average cost of only $ 0.20 per child. However, with several hundred million such cases occurring every year, the aggregate cost of treating all of them would be substantial.

But providing antibiotics is not a simple matter in communities with little access to health care or health education. Families may delay seeking treatment for their child, or not receive that treatment, until it is too late. Shortages of doctors and health workers trained in the management of such cases compound the tragedy. National strategies to reduce the toll have been introduced in many countries. But they are absent or lagging behind in many others that have inadequate health infrastructures, particularly the poorer nations of Africa.

The burden of acute lower respiratory infections is not only in loss of lives. They are an expensive drain on meagre health resources, accounting for 30-50% of visits by children to health facilities everywhere. They are the condition for which antibiotics are most often prescribed – and misused – worldwide.

In contrast, while the majority of acute upper respiratory infections that affect the ear, nose and throat are also very common worldwide, particularly among children under age 5, they are seldom life-threatening. The most important exception is rheumatic fever, a complication that develops from certain bacterial throat infections, and which can lead to rheumatic heart disease. An estimated 12 million people are affected by these related conditions, with almost 500 000 deaths a year. Rheumatic fever can be cured by prompt, appropriate and adequate treatment with antibiotics.

Despite the availability of vaccines against them, four airborne infections continue to kill some 1.4 million children a year. The diseases are measles, pertussis (whooping cough), meningococcal meningitis and diphtheria.

Before a vaccine became available in the 1960s, ***measles*** killed between 7 and 8 million children a year and caused an estimated 135 million cases a year worldwide. Today, it still kills about 1 million children of the estimated 42 million who are sick, the great majority in developing countries. Thus measles is still the leading killer among vaccine-preventable diseases of childhood, taking its toll mainly among malnourished children whose natural defences have been weakened by other infections, and who live in crowded urban conditions.

Measles is one of the most readily transmitted infectious diseases, caused by a virus spread by droplets or direct contact with nose or throat secretions of infected persons. It produces fever and a characteristic red rash, and can lead to serious and fatal complications in-

Measles is still the leading killer among vaccine-preventable diseases of childhood.

cluding pneumonia, diarrhoea and encephalitis (inflammation of the brain). Many children subsequently suffer deafness, impaired vision or blindness.

Pertussis (whooping cough) was a major killer of babies and children under the age of 1, until it became vaccine-preventable around 1960. Since then, the worldwide number of cases and deaths has dropped dramatically. But it is estimated that 40 million are currently sick, and that 355 000 die each year.

Whooping cough occurs worldwide but most deaths are in countries of Africa, Asia, and Central and Latin America. Cases are on the increase in some eastern European countries. It is one of the most lethal diseases of infants and young children who have not been immunized, particularly those with underlying malnutrition and other respiratory infections such as pneumonia.

The disease is caused by bacteria spread by droplets discharged from the nose or throat of an infected person, often an older child in the same family. It causes an increasingly violent cough, forcing the victim to expel air in the lungs and then gasp desperately for breath. The rapid intake of air produces the high-pitched whoop which gives the condition its name. Complications include brain damage, convulsions, blindness and deafness.

Diphtheria can make a deadly comeback if immunization is not maintained.

Meningococcal meningitis is a serious illness which ends fatally in as many as 80% of untreated cases, and in up to 10% of those treated. Young children are most at risk. WHO's conservative estimate is of some 350 000 cases and 35 000 deaths a year, but the figures are higher during epidemic waves, which occur at unpredictable and irregular intervals in many countries. The occurrence of the disease among schoolchildren and groups of young adults such as army recruits is a cause of concern.

Epidemics have been occurring worldwide in recent years, from the "meningitis belt" of Africa, spanning a dozen countries from Ethiopia in the east to Senegal in the west, to the Americas, Asia and Europe. The reasons are unclear, but may include large population movements, overcrowded households and poor living conditions. Acute respiratory infections may also contribute to the development of the disease. Certain climatic conditions, such as dry seasons and dust storms, also increase the risk of infection.

The disease is caused by a bacterium discharged in droplets from the nose and throat of infected persons. It strikes suddenly with fever, intense headache, nausea, vomiting and a stiff neck, and can progress to coma and death. The disease takes its name from inflammation of the meninges, the membranes that cover the brain and spinal chord.

Although vaccines against meningococcal meningitis exist and are used in some military recruit populations and for epidemic control, the existing vaccines are not very effective in the first two years of life and are not a routine component of infant immunization programmes.

Diphtheria was also a leading cause of death in childhood until the introduction of a vaccine 50 years ago. Mass immunization campaigns since then have made it extremely rare in industrialized countries. The true numbers of diphtheria cases and deaths are unknown because of incomplete reporting from most countries where the disease occurs. WHO estimates that there are about 100 000 cases a year and up to 8 000 deaths.

The recent epidemics of diphtheria in the Russian Federation, Ukraine and other countries of the former USSR are a warning that this disease can make a deadly comeback if immunization is not maintained. Up to 25% of those affected in the current outbreaks have died as a result.

The epidemics in eastern Europe began in the Russian Federation in 1990 and have since involved 15 countries. From January to June 1995, a total of about 25 000 cases was reported, and there are signs that the epidemic is beginning to stabilize. A death rate as high as 50% has been reported among children under the age of 2 in Turkmenistan.

These epidemics are largely due to decreasing immunization coverage among infants and children, waning immunity to diphtheria in adults, movements of large groups of population in the last few years, and an irregular supply of vaccines.

Diphtheria is caused by a toxin produced by a bacterium that infects the nose and throat and is spread by airborne droplets or by touch. A sore throat and mild fever are the main symptoms; serious complications occur when the toxin enters the bloodstream. It can then cause heart failure or damage to the nervous system, including paralysis of the throat or limbs.

The diphtheria vaccine is usually administered as part of the combined diphtheria-pertussis-tetanus vaccines (DPT). Approximately 80% of the world's children receive three doses of the combined vaccine in the first year of life. There are other diphtheria vaccines for older children and adults.

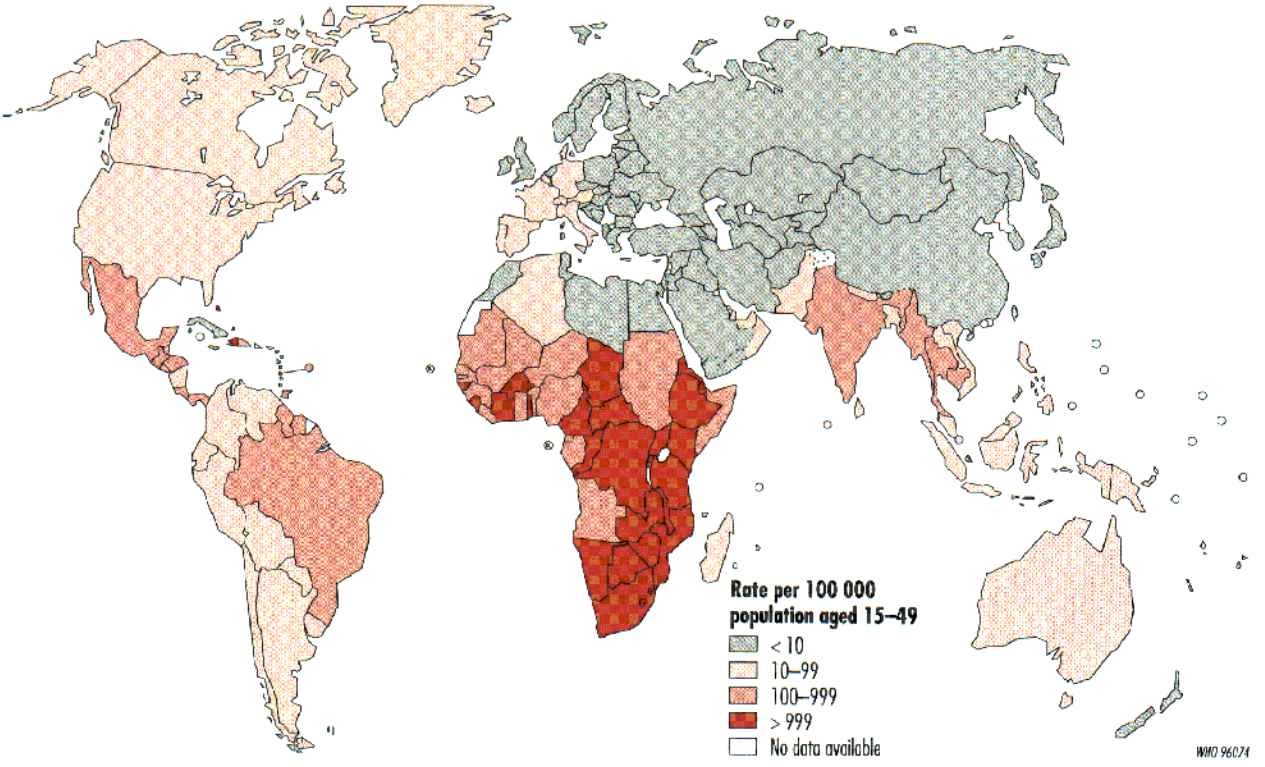
An estimated 8.9 million people developed ***tuberculosis*** in 1995, bringing the global total of sufferers to about 22 million, of whom about 3 million will have died in the same space of time. This huge toll is the price the world is paying for complacency. It is the cost of learning that tuberculosis is not, after all, a disease of the past.

The magnitude of the problem is such that WHO declared it a global emergency in 1993. If the effectiveness and availability of tuberculosis control measures do not improve substantially, more than 30 million tuberculosis deaths and nearly 90 million new cases are expected to occur in the last decade of this century. Without prompt and effective action, the epidemic can be expected to worsen.

Eight out of ten of all those struck by tuberculosis are in the economically productive age group of 15-59 years. About 95% of sufferers are in the developing world, with South-East Asia, the Western Pacific and Africa the worst-affected regions.

To make the global situation worse, tuberculosis has formed a lethal partnership with HIV. The AIDS virus dam-

Map 4. Tuberculosis/HIV co-infection, 1994
Estimated prevalence



ages the body's natural defences – the immune system – and accelerates the speed at which tuberculosis progresses from a harmless infection to a life-threatening condition. The estimated 10% activation of dormant tuberculosis infection over the life span of an infected person is increased to 10% activation in one year if HIV infection is superimposed.

Tuberculosis is already the opportunistic infection that most frequently kills HIV-positive people. Of an estimated 1 million AIDS-related deaths in 1995, about one-third might have been due to tuberculosis. While only 9% of the total of 3 million tuberculosis deaths in 1995 were related to AIDS, the percentage is expected to reach 17% by the year 2000 (*Map 4*).

Tuberculosis is not limited to poor countries or poor populations.

At the same time, drug-resistant tuberculosis is a growing threat worldwide. Incomplete or inappropriate treatment of the disease has spawned the development of strains that are resistant to drugs that once destroyed the bacteria in 100% of cases.

If properly treated, tuberculosis is curable in virtually all cases, provided that it is not caused by bacteria resistant to a range of drugs. If untreated, the disease is fatal in more than half the cases. Non-vaccinated babies are most vulnerable to developing the severest forms (meningitis and disseminated or "miliary" tuberculosis) after becoming infected.

Cure rates of up to 95% (which can be achieved for drug-susceptible tuberculosis) fall to 56% or less with isoniazid and rifampicin resistance, and among AIDS patients infected with bacilli resistant to both drugs a case-fatality rate of 91% has been reported in one study. Multidrug-resistant strains are as contagious as normal strains, but more lethal as only very few, and mostly expensive, drugs can kill them.

Tuberculosis is transmitted by bacteria spread into the air when a patient with the active disease coughs or sneezes. The bacteria inhaled by another person multiply in the lungs, but in most individuals, the immune system halts the spread of the infection. It may then lie dormant, only to be reactivated many years later, when progressive lung damage occurs. The main symptoms are severe coughing, sometimes with blood, chest pain, breathlessness, fever and weight loss. Tuberculosis can spread to affect any organ or tissue in the body.

Children born in past decades in regions with high population growth rates are now reaching the ages where tuberculosis takes its highest toll. Growing numbers of poor, malnourished people live in unhygienic, overcrowded conditions in which person-to-person transmission of diseases such as tuberculosis is most likely to occur. As with other infectious diseases, international travel and migration, and the moving shadow of poverty can be expected to assist the spread of the disease.

Tuberculosis is not limited to poor countries or poor populations. Outbreaks are increasingly occurring in the United States. The disease had declined there from 84 300 cases in 1953 to 22 200 in 1984, an annual drop of about 4%. But from 1985 to 1993, the number of cases increased by 14%. Of the 25 300 cases reported in 1993, 73% were among racial and ethnic minorities. Recent outbreaks in the United States have included several of the multidrug-resistant forms in hospitals or prisons, with a high mortality rate (about 70%). Most of these cases involved people who already had HIV infection, while some were health workers infected by their hospital patients.

In several European countries, an increasing number of cases occur among foreign-born individuals. Deaths from tuberculosis are rising in much of eastern Europe, especially the former USSR, mainly due to lack of drugs and the constraints faced by the health systems.

In many developing countries, particularly in Asia, acquired resistance remains high, because national tuberculosis control programmes in these countries have not been able to achieve a high cure rate over a very long period of time, even after the introduction of short-course chemotherapy.

Wherever the disease is spreading, the root causes are the same: the complacent neglect of the disease by health authorities and the breakdown of tuberculosis control programmes.

The world is only a few years away from witnessing the elimination of ***leprosy*** as a public health problem. This means that the prevalence in any community will not exceed one case in 10 000 people. The elimination of a disease that has always haunted mankind should rank as one of the great achievements of the 20th century.

There is still some way to go and much work to be done before the target is reached. Today there are an estimated 1.8 million people with leprosy in 70 countries. Over half a million new cases are detected every year. But the total number of cases has dropped by a remarkable 67% from the estimate of 5.5 million in 1991, and by 85% since 1985, when there were about 12 million cases.

Today most persons with leprosy – 1.26 million – are in South-East Asia. There are 220 000 people with leprosy in both Africa and the Americas, 70 000 in the Western Pacific, 60 000 in the Eastern Mediterranean and 6 000 in Europe.

Numbers alone cannot express the dreadful physical and social burden caused by leprosy. The disease does not kill but can cause permanent and progressive physical disability including severe mutilation of the face and extremities and widespread damage to nerves, bones, eyes and vital organs.

The psychological trauma is as important as the physical effects: until 50 years ago there was no effective cure and countless sufferers were isolated for life in institutions. Those that were not isolated invariably became the victims of extreme social stigmatization. That continues to be true today, and the same applies to their families, and often even to the communities where they live. But contrary to popular belief, leprosy is not highly contagious, and only people living in prolonged close contact with an infected person are at risk.

Leprosy is caused by a bacterium which affects mainly nerves and skin and is spread from person to person by droplets from the nose of an infected individual. It is the response of the body's immune system to the bacteria, rather than the infection itself, which causes the physical symptoms. Damage to nerves produces numbness and severe scarring in the hands and feet, sometimes with the loss of fingers or toes. Muscles become paralysed and bones gradually destroyed. Blindness and deformity are among the consequences.

The first antileprosy drug was introduced in the 1950s but within 20 years had become largely ineffective because of bacterial resistance. Newer and better drugs were developed and the real breakthrough came in 1981 with the adoption of the WHO-recommended multidrug therapy as the standard for leprosy control programmes. This treatment, consisting of a combination of drugs given over a period of 6-24 months depending on the form of the disease, is highly effective in achieving a cure.

The phenomenal results and the prospects of further gains led in 1991 to leprosy being targeted for elimination as a public health problem by the year 2000.

Leprosy is targeted for elimination as a public health problem by the year 2000.

The greatest natural catastrophe to assault mankind was almost certainly the ***influenza*** pandemic in 1918-1919. Sweeping across the world, it killed 20-40 million people in the space of a year. Many of these deaths came after a very brief illness in otherwise healthy adults. Such is the power of a virus.

Yet today, most people don't take "flu" very seriously, regarding it as little more trouble than the common cold. Such general complacency to this and many other infectious diseases is extremely dangerous. In the United States alone, 10 000-40 000 people, mostly elderly, die in an average influenza season.

The disease, a respiratory infection, is spread easily among people by airborne droplets and possibly also by direct contact. It strikes in temperate climates such as those of North America and Europe during winter, and during the rainy season in the tropics, or sporadically throughout the year. Symptoms include fever, headache, muscle pain, sore throat and cough, and may develop into life-threatening pneumonia. Severe symptoms and death occur mainly among the elderly or people in poor health due to other underlying diseases.

Official statistics on influenza cases worldwide scarcely exist and give only a fraction of the real total. One reason is that most people with influenza-like illness do not seek medical care unless they become seriously ill; another is that influenza-like illnesses can be induced by other viruses. Undoubtedly, many millions of cases go unrecorded every year, and influenza imposes a heavy socioeconomic burden. Epidemics disrupt the ability of whole communities to function. When as many as a third of the local population may be affected and unavailable for work, it is difficult to secure transport, communication, industrial output or the medical care which will be in high demand.

An effective influenza vaccine may protect up to 80% of recipients when it is closely matched to the subtypes of virus in global circulation. To get the closest match possible, the vaccine composition needs to be updated each year on the basis of scientific information supplied by WHO through a network of influenza monitoring centres around the world. The vaccine is used primarily to prevent deaths, but it can also shorten the duration of the illness. Yet the shortcomings of even a closely-matched vaccine and the need for yearly administrations mean that influenza epidemics cannot be entirely prevented.

Could the 1918 catastrophe happen again? Scientists know that another influenza pandemic will occur, but neither the timing of its arrival nor its impact can be predicted. Research may eventually result in a new influenza vaccine that gives longer-lasting immunity and protection against a wider variety of viral strains than those that now exist, which have to be updated every year. In the meantime, global vigilance against influenza is essential.

Cases of poliomyelitis have declined by about 85% since the eradication campaign was launched in 1988.

Direct contact diseases in children

Vast areas of the world are becoming completely free of **poliomyelitis**, and WHO's campaign for the global eradication of this crippling and sometimes fatal disease by the year 2000 looks likely to be achieved. The only disease that has already been eradicated is smallpox.

Cases of poliomyelitis have declined by about 85% since the eradication campaign was launched in 1988. Only 8 549 cases were reported worldwide in 1994, although WHO estimates that fewer than 1 case in 10 is actually reported, and the true figure may be as high as 90 000 cases. The viruses that cause polio have disappeared from the Americas – the last case was reported in Peru in 1991. The Western Pacific region is rapidly becoming polio-free. It has been more than a year since wild polioviruses have been found in China, and more than two years in the Philippines. The Indian subcontinent remains heavily affected, reporting more than two-thirds of all cases. Other areas which remain endemic are West and Central Africa and some countries in the Middle East and the Horn of Africa.

Poliomyelitis is caused by three closely-related viruses and is spread most often by direct contact through close association with infected individuals. Faecal contamination of food or water can spread the disease in situations where sanitation is poor. The disease typically strikes very young children, 80-90% of them under 3 years of age. Poliovirus infection produces only minimal symptoms for most children, but in about 1 in every 100, the virus enters the spinal chord and brain, causing paralysis of the muscles. The legs are most often affected, but in some severe cases the muscles of breathing and swallowing can be paralysed, threatening life.

The first effective, injectable vaccines against polio were introduced in 1955. Mass immunization of children in the 1960s with oral polio vaccines led to the elimination of poliomyelitis from most industrialized countries. With the assistance of WHO, UNICEF and many other donors, immunization programmes now exist in every country. Under the banner of the Expanded Programme on Immunization, 85% of infants born in 1990 received three doses of oral polio vaccine. Most unimmunized children live in developing countries which, consequently, bear the major burden of this disease.

Startling progress towards eradication is being made. To mark WHO's World Health Day in 1995, 18 contiguous countries in the Middle East, Caucasus and Central Asia immunized over 63 million children – the biggest multi-country effort of its kind. In a single day, China immunized more than 80 million children, and India 82 million. During 1995, more than 300 million children were immunized in 51 countries during mass campaigns aimed at eradicating polio.

Trachoma is a major preventable cause of blindness in developing countries. In addition to some 5.6 million people who are at present blind or visually disabled, there are some 154 million others with the active form of the disease, and a total of 540 million at risk of infection. Most blindness is found in African and Asian countries.

Trachoma is transmitted by close personal contact but may also be spread by means of contaminated towels or handkerchiefs. The disease causes a discharge from the eyes in which it can be passed from person to person. Children living in crowded and unhygienic conditions are particularly affected and are likely to be constantly reinfected through contact with infected persons.

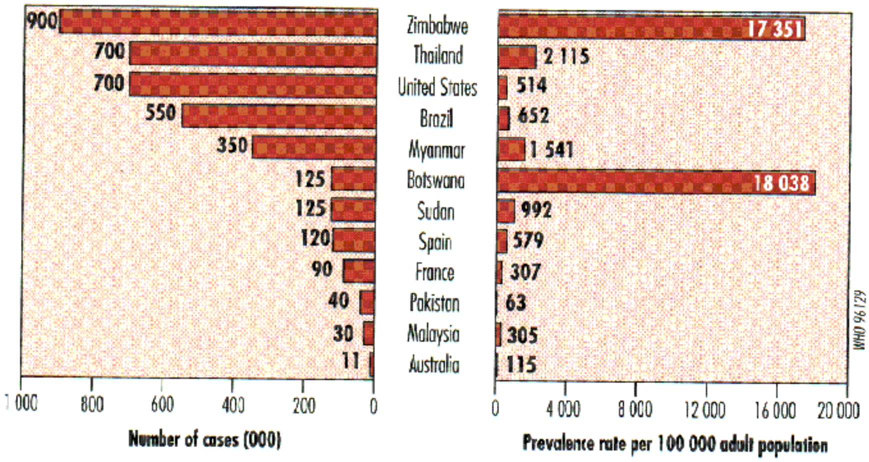
The development of severe, blinding trachoma is characterized by repeated reinfections during childhood and adolescence. The infection is caused by the microorganism *Chlamydia trachomatis*, which resembles a bacterium but, like a virus, can only reproduce itself within living animal cells. Trachoma causes inflammation in the membrane lining the inside of the eyelids. Over a period of years this leads to the formation of scars which in turn begin to damage the surface of the cornea. Visual loss and blindness follow unless the infection is treated.

Sexually transmitted diseases

The ***HIV*** pandemic which began in the late 1970s has now affected every continent. Largely due to direct, person-to-person transmission, around 20 million adults are currently infected, and more than 4.5 million of them have developed ***AIDS*** since the beginning of the pandemic. By the year 2000, it is estimated that there will be some 26 million adults living with HIV worldwide. *Fig.* 6 shows the number of adults infected with HIV, and the prevalence rate for selected countries.

HIV stands for human immunodeficiency virus, a name that indicates what the virus does: it weakens the body's natural defences, or immune system, leaving it vulnerable to all sorts of other infections. Normally, the body can resist many of these infections, but HIV gives them the opportunity to have a lethal impact. They are therefore known as opportunistic infections and AIDS (acquired immunodeficiency syndrome) is the collective name for them when they are related to HIV infection.

Fig. 6. HIV infection, adults aged 15 to 49 years, selected countries, 1994 estimates



As a cause of death, AIDS ranks lower than tuberculosis, acute respiratory infections and malaria, each of which kills millions of people a year. But AIDS is unlike most other infectious diseases. It incapacitates and kills young and middle-aged adults who are at their most productive, and so far it has mainly affected skilled and managerial workers of the kind that developing countries in

Box 6. Preventing HIV and AIDS: lessons from Thailand

In the last ten years, Thailand has achieved dramatic economic growth, averaging 8-10% annually, and now has one of the strongest economies in the developing world. But the future prosperity of this country of some 56 million people is threatened by the spread of HIV/AIDS.

The HIV epidemic hit Thailand in the late 1980s. The first wave was among injecting drug users. The prevalence of HIV infection in this group rocketed from zero to 35% between 1987 and 1993. The second wave was among sex workers, reaching 33% by December 1994. The third wave was among their clients – over 8% of men attending clinics for sexually transmitted diseases (STDs) in 1994 were HIV-positive. Infection among women attending antenatal clinics increased to about 1.7% in 1994, and a growing number of HIV-positive children are being cared for in Thai hospitals – evidence of the fourth and fifth waves of the epidemic.

Fortunately, Thailand is a good example of how a country can move quickly from complacency to action against HIV/AIDS. The Thai response has been rapid and comprehensive, with the government launching one of the biggest prevention efforts seen anywhere. Television has played a key role in national education campaigns. Use of condoms has been promoted first in the commercial sex industry and then among the broader public, with up to 70 million condoms distributed free each year and about the same number again sold over the counter each year. To support government efforts, NGOs have developed a wide range of AIDS prevention programmes and activities, together with support projects for people affected by HIV and AIDs.

The condom use campaign and other educational schemes appear to have achieved considerable success. The incidence rates of gonorrhoea and syphilis have dropped from respectively 2.4 and 1.1 per 1 000 persons in the age group 15-49 in 1990 to 0.3 and 0.2 per 1 000 in 1993. The overall incidence of all STDs among men fell by over 80% between 1987 and 1993. The prevalence of HIV among young military recruits fell from 7.5% in 1992 to 3.4% in 1994.

But the death of people with AIDS also represents a loss of income, and affects the welfare of other family members, including extended family and the community in general. The indirect costs of AIDS care, and also those of discrimination and stigmatization, mean that in rural areas family income is drastically reduced, borrowing is increased and up to 15% of children may be removed from school and put to work in order to supplement family income.

The economic implications of the epidemic are enormous. Direct consequences include the medical costs of treating a growing number of people with HIV-related diseases, which is expected to reach 10 times the current number of hospital beds in Thailand within a few years. Indirect costs will stem from AIDS-related deaths and illness among adults in their prime productive years, whose contribution to the national economy will be lost. Economic experts predict that as a result of HIV and AIDS, Thailand's GDP may be reduced by up to 25%. But it is also estimated that if the current AIDS control campaign is sustained throughout this decade, at least one-third of projected losses could be averted.

particular cannot afford to lose. Among adults, it has become one of the first causes of death in urban areas of the United States, sub-Saharan Africa and parts of Europe.

As of end-1995, of all those alive with HIV infection, 13 million are in Africa, 4 million in South-East Asia and 2 million in the Americas. Projections show that the number of AIDS cases in most regions will continue to rise steeply until between the years 2005 and 2010. It will then continue at a relatively high level, imposing the heaviest cost burden on those regions and countries least equipped to pay.

The cost of caring for people with AIDS is high. Family members also suffer: young children who lose their mothers to AIDS are more likely to die themselves and there is a growing population of "AIDS orphans", unable to care for themselves, whose parent(s) have died of AIDS. Meanwhile, few promising drugs against AIDS have been developed, and none that is affordable by low-income countries. Vaccine development is more complicated, requiring considerable time and cost. An effective vaccine is unlikely to be available for some years.

As the numbers of HIV infections and AIDS cases increase relentlessly, efforts to curb the course of the global epidemic may appear to be of limited use. But there is heartening evidence (*Box 6*) that some prevention campaigns may slowly but definitely be influencing the overall future of this tragedy.

HIV is essentially a sexually transmitted infection, although it can also be spread in other ways, including through contaminated blood or blood products, contaminated needles used by illicit drug injectors, and from mother to baby before or around the time of childbirth.

People infected with HIV can remain healthy for years. The role of factors that influence the progression from infection to AIDS is still far from clear. But the danger of this long incubation period is that individuals can infect others with HIV. The majority of infections are due to unprotected sexual intercourse – that is, without the use of a condom – in which one of the partners is HIV-positive. Condoms act as a barrier to prevent the virus passing from one person to another.

WHO estimates that at least 333 million new cases of ***sexually transmitted diseases***, other than HIV infection, occurred in 1995. These diseases are chlamydial infection (89 million), gonorrhoea (62 million), syphilis (12 million) and trichomonas (170 million).

The burden of these diseases is far greater than the symptoms of discomfort, pain and discharge caused by initial infection. They may cause serious complications, especially in women, including pelvic inflammatory disease – a major cause of infertility. Chlamydial infection, gonorrhoea and syphilis can be passed on to infants during pregnancy and childbirth. Their effects range from abortion and stillbirth to severe eye infections and pneumonia in the newborn.

Furthermore, there is strong evidence that these four diseases greatly increase the risk of sexual transmission of HIV, especially when accompanied by genital ulcers, a common symptom of some sexually transmitted diseases, which may give HIV easier entry into the bloodstream. Studies suggest that the risk of HIV infection is about four times greater in the presence of a genital ulcer.

Bloodborne infections

Six different viruses are known to cause hepatitis, an infection of the liver. They are identified by the letters A, B, C, D, E and tentatively, G. They are not all transmitted in the same way. Of the six viruses, hepatitis B and C, which are the most serious due to their long-term effects, are transmitted by exposure to contaminated blood and blood products.

More than 2 billion people alive today have been infected with ***hepatitis*** **B**. Some 350 million of them are chronically infected and therefore at risk of serious illness and death from liver cirrhosis and liver cancer. Every year, more than a million hepatitis B carriers die as a consequence of these two conditions.

Hepatitis B is the most infectious of the hepatitis viruses, and is one of the most tragic examples of person-to-person transmission of a disease. The infection can be passed from a mother to her newborn child, from one child to another, from children to adults, and from adult to adult. It is tragic because children who get infected early in life, especially those infected at birth, become the chronic carriers who are the main spreaders of the disease. And it is more tragic still because there is a vaccine that protects against it – one of the safest and most effective vaccines yet developed against any disease.

Hepatitis B leads to one of three outcomes. An infected person may die within days or weeks of the onset of the disease (a rare event); may recover and develop lifelong immunity; or may develop the "chronic carrier" state, a persistent infection which usually lasts for life. The age at which a person becomes infected is the major factor in determining the outcome, the newborn and the young child having a higher propensity to develop the chronic carrier state.

Acute hepatitis B may first strike following an incubation period of 45 to 180 days after infection. Extreme fatigue, jaundice, dark urine and abdominal pain are the main symptoms. The infection itself is rarely fatal, but sufferers may lose several weeks or months of work because of their illness. There is no specific treatment for acute hepatitis B.

The hepatitis B virus (HBV) can be transmitted through blood, blood products, semen and vaginal fluids. Sexual transmission, both heterosexual and homosexual, accounts for most cases of adult transmission.

Contaminated needles and syringes used by drug addicts are another important means of spread. The infection may also be transmitted through contamination of cuts, wounds or other skin injuries. Accidental transmission by sharing toothbrushes or razors can also happen. The disease is the major infectious occupational hazard to health care workers who have not been immunized.

More than 2 billion people alive today have been infected with hepatitis B.

Box 7. Hepatitis C infection: an emerging global issue

Infection with the hepatitis C virus (HCV) has become an issue of global significance. Since the virus was first identified in 1989, it has been recognized worldwide as a major cause of chronic hepatitis, cirrhosis and liver cancer. Up to 100 million people are chronically infected with it, including 3.5 million in the United States and over 10 million in Europe. There is no vaccine, no successful treatment and prevention is difficult, particularly in developing countries where it is most common.

The virus is transmitted mainly through transfusions of contaminated blood or blood products. Risks of this type of transmission have been largely eliminated in industrialized countries through anti-HCV screening techniques. However, for health care workers it is an occupational hazard requiring adherence to universal precautions – cleaning and disinfection of instruments, machines and surfaces that are routinely touched, avoidance of sharing articles between individuals, frequent hand-washing and the systematic use of gloves. Intravenous drug users who share needles are at high risk of infection.

Major prevention problems persist in developing countries. Many of them cannot afford the anti-HCV blood test kits, which cost $5 per test. The use of contaminated equipment for injections and other medical and dental procedures is widespread.

Traditional practices such as circumcision, tattooing and scarification with contaminated instruments can spread HCV infection.

Efforts are therefore necessary to persuade the manufacturers of tests to lower the costs for developing countries. Health education programmes are also needed to inform the general public and health care workers about the risk of transmitting infection with the use of unsterile equipment.

Surveillance on a global scale needs to be strengthened in order to improve medical knowledge of transmission of the virus.

Interferon is the only drug that has been found effective in the treatment of HCV infection. However, treatment is very expensive – thousands of dollars for the drug alone – and must be administered by injection several times a week for several months. Moreover, some patients experience serious side-effects. Also, about half of the patients go into remission, but 50% relapse when treatment is stopped: only 25% have long-term remission. Such rates pose ethical questions on such matters as the need to obtain the informed consent of patients who are offered the treatment, and the responsibilities of governments in subsidizing the cost of the treatment. Given its cost, only a minority of patients can afford it or are likely to be offered it.

Studies involving less costly, orally administered drugs are continuing, but results so far have been disappointing.

For a number of technical reasons, the development of a vaccine to prevent HCV infection is unlikely for many years.

Women with HBV infection can pass it to their baby around the time of childbirth (perinatal transmission), one of the most efficient and serious ways in which HBV is spread, at least in Asia. Infected women have a high risk of infecting their newborns, and almost all of these babies will become HBV carriers themselves. They will grow up to infect other children in the community, and eventually when they are adults, they will infect their own offspring.

Transmission from child to child, often called horizontal transmission, is responsible for the majority of HBV infections and carriers in parts of the world other than Asia. The spread occurs, researchers believe, through physical contact between children with skin conditions such as impetigo and scabies, or with cuts or grazes. Often transmission occurs when children play together or share the same bed.

Researchers have divided the world into areas where the presence of the infection is "high", "intermediate" or "low", with carrier rates of more than 5%, between 2% and 5% and less than 2% respectively. In the first category, where most of the population becomes infected, either as newborns or in childhood, are Africa, Asia east of the Indian subcontinent, the Pacific Basin, the Amazon Basin, the Arctic Rim, the Asian republics of the former USSR, and portions of the Middle East, Asia Minor and parts of the Caribbean.

The "intermediate" areas include parts of southern and eastern Europe, the Middle East, western Asia through the Indian subcontinent, and some parts of Central and South America. In these areas, both child-to-child and adult-to-adult transmission occur. The "low" areas include North America, western Europe, Australia and parts of South America. Here, most infections occur in adults through sexual activity, needle-sharing during drug abuse, or during occupational exposure to blood.

Until a few years ago, the only types of viral hepatitis that could be confirmed were types B (which is described above) and A, which is transmitted through contaminated water and food, and is described in the next section. All others were described as non-A, non-B, that is, neither hepatitis A nor hepatitis B viral infection could be confirmed in blood tests of patients. Since the ***hepatitis C*** virus (HCV) was identified in 1989, it has been shown to be the cause of non-A, non-B hepatitis in over 90% of cases, and is found worldwide.

WHO estimates that about 100 million people worldwide are chronically infected with the virus, including about 3.5 million in the United States and more than 10 million in Europe. Mediterranean countries of Europe, Africa and the Middle East have relatively high prevalences, as does Japan.

Like hepatitis B, it is one of the most common causes of chronic hepatitis, cirrhosis and liver cancer. It may take as long as 20 years to develop into liver cancer, and is more likely to do so in men than women, and in alcohol consumers. However, the epidemiology of hepatitis C is not well understood (Box 7).

Preventing and controlling diseases transmitted from person to person

The root causes which underlie the major airborne and droplet infections are poverty; overcrowding, particularly in big city slums and shanty towns; the mass migration of people, either from rural to urban areas or as refugees; and gaps in education.

Some airborne diseases are in general well controlled, requiring little more than firm commitment to continuing action against them. Others persist in countries or areas where lack of resources is a major handicap. Yet others have made a return because of drug resistance, complacency, or deterioration of public health services. Specific actions tailored to individual diseases, such as immunization, treatment, surveillance and public education, need to be strengthened.

WHO has set the target of reducing deaths from ***acute respiratory infections*** in children under age 5 by one-third by the year 2000 – equal to more than 1.4 million lives saved per year. But achieving this target is threatened because, as mentioned earlier, the two cheapest and hitherto best antibiotics to treat pneumonia, the leading killer among acute respiratory infections, are now much less effective due to bacterial resistance. This means that either more expensive drugs must be used, or that more children will die from these infections.

Excellent progress has been made in ***measles*** control in recent years. The Region of the Americas has implemented a periodic mass immunization strategy combined with strengthening of surveillance to interrupt measles transmission and eliminate the disease by the year 2000.

This initiative helped to revive interest in improving measles control worldwide. Mass immunization in poor urban areas has been adopted as a strategy to reduce the measles disease burden in environments where case fatality is highest. Efforts to develop surveillance of measles have resulted in wider understanding of the changes brought about in measles epidemiology by measles immunization and in the more accurate prediction of measles outbreaks.

Some countries have successfully carried out mass immunization to prevent epidemics. In spite of this progress, global measles coverage has remained stagnant at around 80% for the last four years. In some countries, mostly in Africa, measles vaccine coverage is below 50%, which means that the disease will continue to be endemic there.

Effective global control of ***pertussis*** depends on countries using the vaccine in national immunization programmes in which it is combined with diphtheria and tetanus toxoids. New pertussis vaccines are being developed.

Meningococcal meningitis is potentially preventable through vaccination of both children and adults and the use of antibiotics to protect close contacts of those already infected. When used in rapid mass immunization campaigns they can bring epidemics to a halt. New vaccines are being developed which, if proven to be protective in infants and young children, could be integrated into immunization programmes in areas at high risk of the disease.

Specific actions tailored to individual diseases, such as immunization, treatment, surveillance and public education, need to be strengthened.

The potential worldwide savings resulting from polio eradication have been calculated to exceed $1.5 billion a year.

Better control of ***diphtheria*** worldwide depends on high immunization coverage; prompt recognition and management of diphtheria cases; and rapid identification and effective management of close contacts to prevent further spread of outbreaks. National diphtheria control plans have been elaborated for the republics of the former USSR affected by outbreaks, and mass immunization campaigns, begun in 1994, were extended in 1995.

The best prevention of ***tuberculosis*** is detection and cure of the infectious cases. WHO is urging all countries to adopt the strategy known as "directly-observed treatment, short-course" or DOTS, in which health workers or volunteers watch patients under their care swallow each dose of the medicines for at least the first two months of treatment. Each patient then completes the course of treatment. One of the reasons for past failures in tuberculosis control has been that patients do not take the full course of their medicines for the required period of time. The strategy is already showing remarkable success in some countries. Tuberculosis programmes in many countries are having to be rebuilt after being neglected for many years; in many other countries they simply do not exist.

Almost 6.7 million people with ***leprosy*** were cured by multidrug therapy between 1985 and 1994, and another million patients are currently undergoing treatment. No cases of resistance to multidrug therapy have been reported. The global average cost of implementing the leprosy elimination strategy has been $100 per patient. A cost-effectiveness analysis indicates that the cost per year of healthy life gained ranges from $10 to $38 – a public health bargain.

WHO is taking part in planning for the occurrence of ***influenza*** pandemics. The plans should provide governments with essential guidelines for the best response to a pandemic.

Although a single dose of ***poliomyelitis*** vaccine costs only $0.08, the quantities required and the logistics involved mean that immunization programmes will cost some $2.5 billion between 1996 and 2000. WHO calculates that the countries still fighting the disease meet 80% of the eradication costs. The remaining 20% – equal to $100 million a year until the year 2000 – is being sought from donor countries and agencies.

Eradication cannot be achieved without continuing donor assistance. Rotary International has been supporting polio eradication since the inception of the programme and will have provided a total of more than $300 million by the end of the initiative. Apart from the lives saved and the suffering prevented, there is another bonus. Since smallpox was eradicated in 1977, the world has saved over $20 billion in costs associated with prevention, control and treatment. The potential worldwide savings resulting from polio eradication have been calculated to exceed $1.5 billion a year.

Trachoma can be controlled in several ways, including treatment with antibiotic eye ointment, improving personal and environmental hygiene, and simple surgery. Personal hygiene, particularly keeping the face clean, is important in reducing the spread of trachoma among children. Face-washing a few times a day, even with only a little water, removes from the eyes the discharge which is the main source of infectious spread. Educational programmes for mothers on effective face-washing with very limited quantities of water have been designed. Availability of adequate water can dramatically reduce the spread of infection.

Infection with ***HIV and other sexually transmitted diseases*** is preventable. The adoption of safer sex practices and the increasing availability of condoms as a result of strategies for HIV prevention appear to have played an important role contributing to the declining rates of sexually transmitted diseases that have been reported in some countries.

WHO recommends a comprehensive approach to these diseases which includes promotion of safer sexual behaviour; widespread availability and affordability of condoms; integration of care for the diseases into all basic health care facilities; good-quality case management including use of appropriate drugs, education and counselling, provision of condoms and treatment of sexual partners; promoting early use of health care services by people with sexually transmitted diseases and their partners; and screening for "silent" diseases such as syphilis in pregnancy. This can best be achieved for women by integrating services for controlling these diseases into maternal, child health and family planning services. All WHO recommendations are feasible within the scope of primary health care services. But the very high number of new infections reported in 1995 indicates that the problem is far from being adequately addressed. Lack of comprehensive policies and poor access to the necessary drugs are only two of the obstacles.

Hepatitis B vaccine, if given prior to exposure, can prevent the disease in almost all individuals. The vaccine became available in 1982 and has been used so far in almost 400 million people. Its safety and effectiveness are beyond doubt. It is most effective when used as part of the routine of infant immunizations, but it can be used at any age.

Dramatic declines in the cost of the vaccine in developing countries – from $20 to between $0.50 and $2 per child dose – have allowed public health officials to consider its mass use in infant immunization programmes, although it is still considerably more expensive than the other routine childhood vaccines. About 75 countries now use it in their national immunization programmes.

WHO recommends that general vaccination of newborns, children and adolescents should be implemented by 1997. Considerable efforts are being made internationally to ensure greater commitment by donors. The prevention and control of hepatitis B is one of the major goals that WHO is seeking to achieve by the beginning of the next century.

There is neither a vaccine nor inexpensive drug against ***hepatitis C***. Apart from screening donated blood, its prevention still presents problems.

Foodborne, waterborne and soilborne diseases

Water, food and soil are essential for life, but when contaminated they also transmit bacteria, viruses and parasites that cause some of the world's most menacing diseases, such as diarrhoea, cholera, typhoid, intestinal worms, hepatitis and tetanus. The organisms that are the main causes of these diseases are ingested with water or food or conveyed to the mouth by contaminated fingers. Where there is no proper sanitation, they find their way to other water sources from which they again infect other people. Soil can also be the breeding ground for a wide range of infections to which children are particularly vulnerable, and for intestinal parasites.

Almost half the world's population suffers from diseases associated with insufficient or contaminated water, and is at risk from waterborne and foodborne diseases. Their vital importance as a public health problem is often overlooked, because their true incidence is difficult to evaluate and the severity of their health and economic consequences is often not fully understood.

Diseases are classified as waterborne or foodborne based on epidemiological evidence that implicates consumption or use of water and ingestion of a common food as the source of infection. They are perhaps the most widespread health problems in the contemporary world and an important cause of low or lack of economic productivity. They range in severity from mild indispositions to life-threatening illnesses.

Apart from their immediate effects, foodborne diseases may cause serious and chronic health problems. Some of these diseases – for instance, listeriosis – are particularly dangerous during pregnancy, as they may either be fatal to the fetus or cause severe deformities. In the latter case, the child runs a risk of severe congenital, cerebral or ocular damage.

Apart from their immediate effects, foodborne diseases may cause serious and chronic health problems.

Diseases caused by contaminated food and water

Diarrhoeal diseases caused more than 3 million deaths in 1995, of which more than 80% were among children under age 5. About 50% of diarrhoeal deaths are due to acute watery diarrhoea, 35% to persistent diarrhoea, and 15% to dysentery.

It was long thought that contaminated water supplies were the main source of pathogens causing diarrhoea but it has now been shown that food has been responsible for up to 70% of diarrhoeal episodes. Infections due to pathogenic *E. coli* are the most common cause of diarrhoea. Weaning food contaminated with pathogenic *E. coli* causes up to 25% of all diarrhoeal episodes in infants and children, while campylobacteriosis and shigellosis account for another 5-15% and 10-15% respectively.

> *The economic impact of cholera epidemics, in losses of trade and tourism, can be enormous.*

In 1993, the United States suffered the biggest outbreak of diarrhoea in its history. More than 400 000 people in the city of Milwaukee became ill for an average of 10 days with watery diarrhoea and more than 4 000 needed hospital treatment. The source was municipal water supplies contaminated with the parasite *Cryptosporidium parvum*.

About 200 million people in Asia, Africa and Latin America have symptoms of the intestinal infection **giardiasis**; there are some 500 000 new cases a year, the vast majority of them among children. The infection causes acute and persistent diarrhoea, abdominal pain and rapid weight loss. Lack of sanitation and poor basic hygiene assist its spread. The main mode of transmission is in faecally-contaminated water, but foodborne and person-to-person spread also occur. The disease has become a serious problem in day-care centres in developed countries.

Epidemics of **cholera** and **dysentery** are frequent, striking adults as well as children. Cholera alone causes 120 000 deaths a year, and is particularly deadly in Africa, where epidemics have become more widespread and more frequent since the 1970s, and death rates among sufferers are generally the highest. Seventy-nine million people are estimated to be currently at risk of cholera infection in Africa. A substantial proportion of cases and deaths have been among the displaced and refugee population in Somalia and Zaire.

A pattern of global cholera epidemics – called pandemics – that literally circle the world is being repeated. At least seven such pandemics have been recorded in the last 150 years. The seventh pandemic of the disease caused by *Vibrio cholerae* O1 biotype El Tor, which started in 1961 in Indonesia, spread to Peru in 1991 and then to other countries in South and Central America. In 1993, cholera was reported as endemic in some 80 countries, affecting several hundreds of thousands of people. In an important number of cases, food has been found to be the vehicle for transmission.

A new strain of cholera, code-named 0139, emerged in India in 1992. It spread west to Pakistan and east to China, and in the early months of 1993 caused an estimated 100 000 cases and 1 000 deaths in southern Bangladesh. It has not spread rapidly since then, but remains a threat.

The economic impact of cholera epidemics, in losses of trade and tourism, can be enormous. For example, the 1991 epidemic in Peru cost that country a loss estimated at $770 million, almost a fifth of its total exports in a normal year.

Several countries, especially in Africa, have to cope with the emerging problem of recurrent epidemics of **bacillary dysentery**. The spread of epidemic dysentery started in 1979 in eastern Zaire and since then has invaded all African countries. For several months in 1994, dysentery was the main cause of death in refugee camps in Burundi, United Republic of Tanzania and Zaire. Epidemic dysentery also occurs in Asia and Latin America.

The control of epidemic dysentery is complex because of the limited therapeutic options available. There is increasing resistance of *Shigella dysenteriae* type 1 strains to the usually recommended antibiotics, including nalidixic acid. Alternative antibiotics are expensive.

Typhoid fever causes about 16 million cases and more than 600 000 deaths a year. Almost 80% of cases and deaths are in Asia, and most of the others occur in Africa and Latin America. The socioeconomic impact of the disease is huge, because typhoid survivors take several months to recover and resume work. Since 1950, the organism's resistance to antibiotics has also been a growing problem; by 1989 resistance was reported in a number of countries, particularly in Asia and the Middle East.

Schistosomiasis, also known as bilharziasis, leads to chronic ill-health. About 200 million people in 74 tropical countries have acquired this infection from bathing or wading in infested rivers, lakes and irrigation systems, and 500-600 million are at risk. Because their daily work brings them into frequent contact with infested water, women are vulnerable to the disease.

It is caused by parasitic flatworms or blood flukes called schistosomes, which can penetrate the skin, enter the bloodstream and develop into worms that inhabit the blood vessels of the intestines or bladder. Female worms lay hundreds of eggs in the blood vessels every day for an average of five years, and it is the eggs rather than the worms that damage the intestines, bladder and other organs. The disease causes some 20 000 deaths a year and can lead to a form of bladder cancer which is the primary cause of death among men under 44 years in Egypt. It also takes a high toll in many parts of Africa.

Water development projects, especially large-scale irrigation systems that are intended to boost agricultural output, can spread the disease to previously unaffected areas. Dam construction in three African river deltas – the Nile, the Senegal and the Volta – has led in recent years to schistosomiasis infection in up to 75% of local villagers, and even among people as far as 500 kilometres upstream of the dams.

The disease is also being spread by mass migration from the countryside to urban centres, and has become a serious problem in some big cities of Africa and Brazil.

Infections due to ***helminths*** are also a worldwide public health problem, particularly affecting developing countries. Examples are *Trichinella spiralis*, *Taenia saginata*, and *Taenia solium*, which are acquired through consumption of undercooked or uncooked meat.

Some 40 million people, particularly in Asia, Africa and Latin America, have ***trematode*** infections. More than 10% of the world's population is at risk of becoming infected by these parasites, which are transmitted through the consumption of raw or inadequately processed freshwater fish, shellfish or aquatic plants.

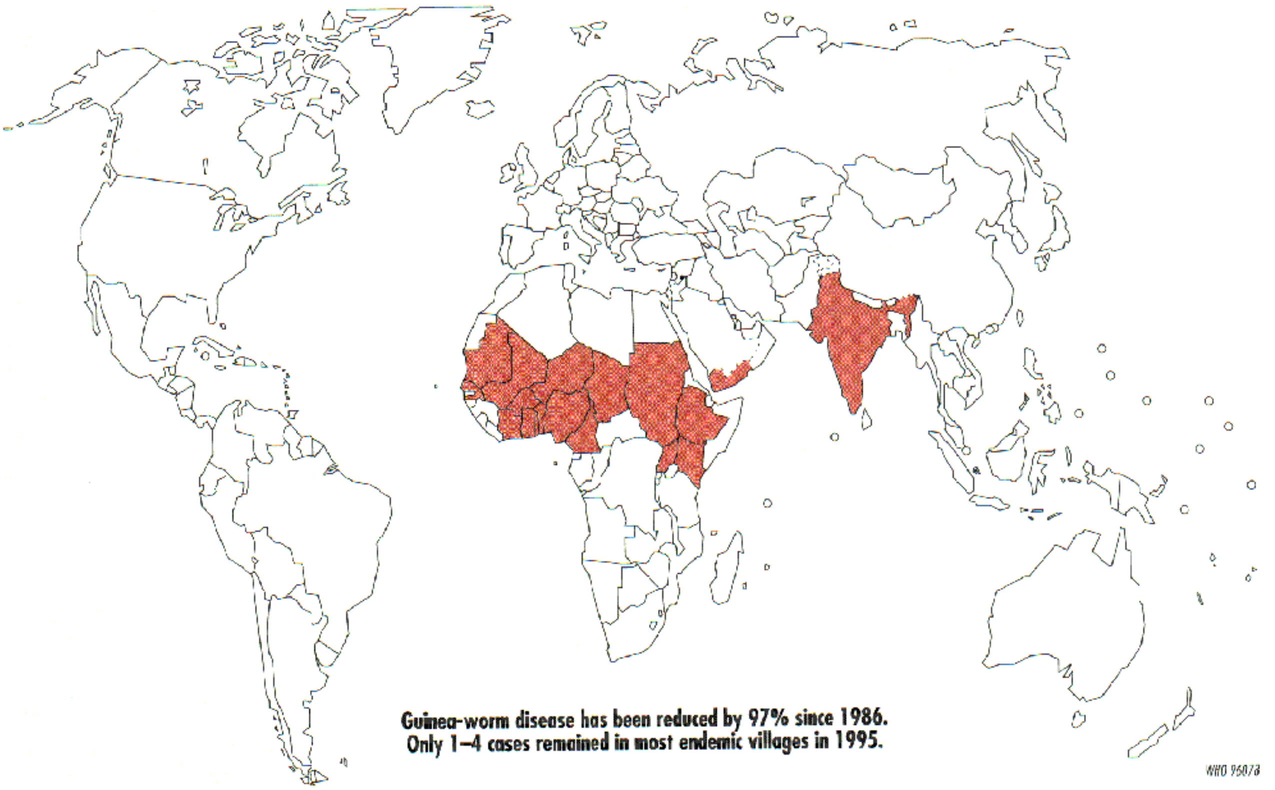
Dracunculiasis (guinea-worm disease) is the only parasitic disease that may be totally eradicated from the world in the near future. Although widely distributed at the beginning of the 20th century, the disease is now found only in sub-Saharan Africa, the Arabian peninsula and India. It is still endemic in 18 countries, of which 16 are in Africa and 10 are in the category of least developed countries. Approximately 122 000 cases were reported from fewer than 8 000 endemic villages in 1995, as compared with 3.5 million in 1986 and 1 million in 1989.

This parasitic disease is transmitted by drinking polluted water in regions where water is a rare commodity. It affects men, women and children equally and has adverse effects on health, agricultural production and school attendance. Horribly painful and incapacitating, it can affect 50% or more of the population in areas where the disease is endemic. Incapacity results from pain and secondary infections associated with the emergence of guinea worms (which are 60-100 cm long and 0.2 cm in diameter) through the skin of the hands, feet or other parts of the body. Those affected do not develop immunity, so people may suffer repeatedly from the disease.

No medicines or vaccines are available to prevent or cure this parasitic disease; however, dracunculiasis is extremely easy to combat and should no longer be prevalent. WHO, together with national programmes, is taking

Dracunculiasis (guinea-worm disease) is the only parasitic disease that may be totally eradicated from the world in the near future.

Map 5. Dracunculiasis – endemic countries, 1995


**Guinea-worm disease has been reduced by 97% since 1986.
Only 1–4 cases remained in most endemic villages in 1995.**
WHO 96078

measures to break this transmission cycle and put an end to the scourge.

The population at risk of infection is estimated at 120 million in Africa and 10 million in Asia. So the fight must continue, and even be reinforced, because the last cases are to be found in the most inaccessible areas. The least interruption of these efforts now would imperil the successes achieved after many years of strenuous effort. The estimated cost of complete eradication ranges from $50 000 in Chad to $3 million in Sudan, with the proviso that there are parts of the country presumed endemic which remain inaccessible due to armed conflict (*Map 5*).

The ***hepatitis E*** virus, discovered in the United States in 1990, exists in many parts of the world, causing outbreaks of hepatitis in Asia, North Africa and Central America, particularly in countries where environmental sanitation is inadequate. The virus is probably a major cause of acute hepatitis in these countries, but does not lead to chronic disease. The infection is mainly transmitted by contaminated water, although person-to-person spread by the faecal-oral route is also likely. Preliminary evidence suggests that a hepatitis E vaccine could be developed in the not-too-distant future (*Box 8*).

The problem of ***foodborne diseases*** is very serious in developing countries, but is not limited to them. The estimated annual incidence of foodborne diseases in the United States ranges from 6.5 million to 80 million cases. Surveys in several other industrialized countries suggest that annually, up to 10% of the population may be suffering from a foodborne disease.

Salmonellosis especially has increased tremendously in industrialized countries on both sides of the Atlantic over the past few years. In many countries, poultry meat, eggs and foods containing eggs have been identified as the predominant sources of this pathogen. In certain countries, up to 60-100% of poultry meat is contaminated with species of *Salmonella*, and beef, frogs' legs, chocolate and milk have also been implicated. In 1985, some 170 000 to 200 000 persons were involved in an outbreak of salmonellosis in Chicago (United States) caused by contaminated pasteurized milk.

In addition, many industrial countries are experiencing outbreaks of diseases due to relatively newly identified types of foodborne pathogens such as *Campylobacter jejuni*, *Listeria monocytogenes* and *Escherichia coli* O157:H7. ***Campylobacteriosis*** has increased to such an extent that it is now the leading foodborne disease in several industrialized countries, for example the United Kingdom. As in the case of *Salmonella*, the main vehicles for the transmission of *Campylobacter* are poultry meat and unpasteurized milk. ***Listeria monocytogenes*** may cause severe foodborne infections, with a high fatality rate in susceptible individuals. The fatality rate, especially in newborns and adults with lowered immunity, is in the range of 27-30%. The microorganism has been implicated in several important outbreaks, involving different types of food such as milk, cheese, vegetables and meat products. At present there is no clear understanding of its biology, but it is known to be able to grow at refrigeration temperatures, and at a wide range of pH values; it is thus of major concern to food industries producing products that are subjected to extended cold storage, such as cheese.

Outbreaks caused by ***E. coli* O157:H7** are giving rise to concern in many countries, as the pathogen causes severe damage to health, and may even lead to death, particularly in children. The number of known outbreaks is increasing (*Map* 6). In 1993, a major outbreak due to consumption of undercooked minced beef (hamburgers) affected more than 500 people in the north-west of the United States. Many children were affected, some suffered from the haemolytic uraemic syndrome and four children died as a result. In Africa, a large outbreak affecting thousands of people in 1992 was also reported to have been caused by *E. coli* O157:H7.

Box 8 . Hepatitis E

The infection caused by the hepatitis E virus (HEV), which was discovered in 1990, is essentially a waterborne disease. Water or food supplies contaminated by faeces in which the virus is excreted have been implicated in major outbreaks reported in all parts of the world that have a hot climate. After an incubation period of 2-9 weeks, a self-limiting acute viral hepatitis appears, lasting for a period of several weeks, which is followed by recovery. No case of chronic disease has been reported. Mainly young adults, aged 15-40, have been affected by acute hepatitis E.

In addition, HEV has a propensity to induce a fulminant form of the acute disease (the mortality ranges between 0.5% and 4%), particularly in pregnant women, up to 20% of whom may develop fulminant hepatitis E, with a mortality that reaches about 80%. The importance of intrauterine infections due to hepatitis E infection during pregnancy, responsible for abortions, intra-uterine death, and high perinatal morbidity and mortality, is currently under investigation.

The first major epidemic was reported in New Delhi in the winter of 1955-1956. After the flooding of the river Yamuna, 30 000 cases of jaundice were described, and retrospectively attributed to hepatitis E. China reported 100 000 cases of jaundice between 1986 and 1988. Since then, additional outbreaks have been reported from Borneo, India, Indonesia, Mexico, Myanmar, Nepal, Pakistan, Somalia and southern Russian Federation.

However, hepatitis E outbreaks or even sporadic cases are rare in temperate climates. In Central Europe and in North America, hepatitis E has been diagnosed only in patients returning from countries with high endemicity for viral hepatitis. But screening of blood donors in these areas has shown a prevalence of anti-HEV antibodies of up to 2.5%. The findings were similar for blood donors from South Africa (1.4%) and Thailand (2.8%). Seroprevalence in blood donors from Saudi Arabia and Egypt were significantly higher (9.5% and 24% respectively). It remains to be determined whether these findings correspond to real past subclinical infections.

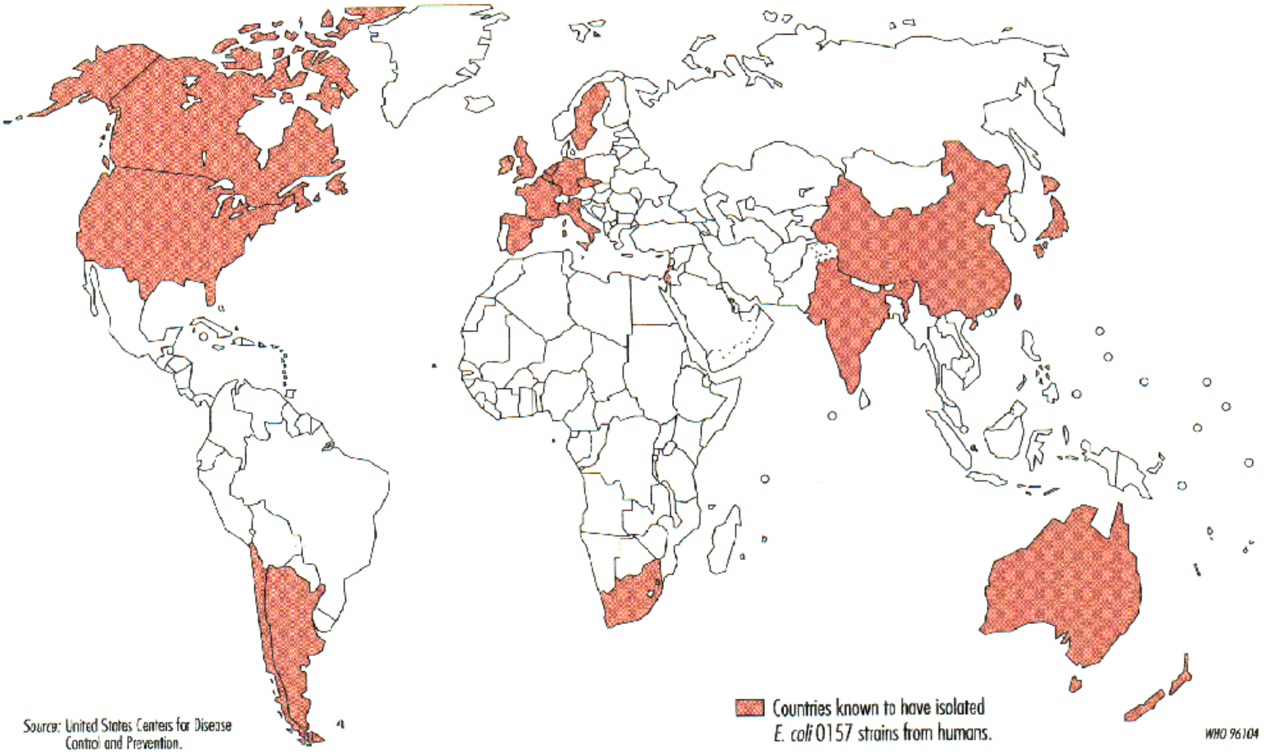
Diagnosis is made by the level of anti-HEV antibodies in the serum. No confirmatory assay is currently available. Anti-HEV IgM antibodies have been determined; however, their usefulness for the diagnosis of acute hepatitis E infection remains to be confirmed. There is no need to treat acute hepatitis E because recovery is always complete. For the fulminant form where mortality can reach up to 80%, there is no specific treatment, merely supportive measures.

For prevention, travellers to highly endemic areas are recommended to take the usual elementary food hygiene precautions. No vaccine or specific immunoglobulin prophylaxis is available. Preliminary studies in primates indicate that protection through vaccination may be achievable in the foreseeable future.

The vehicles of transmission in this outbreak were believed to be contaminated drinking-water and cooked maize.

Hepatitis A is common all over the world: some 10 to 50 persons per 100 000 are affected annually. Shellfish grown in contaminated water have often been recognized as a source of this disease. An epidemic of shellfish-borne

Map 6. E. coli 0157 strains isolated from humans


▨ Countries known to have isolated *E. coli* 0157 strains from humans.
WHO 96104

Source: United States Centers for Disease Control and Prevention.

hepatitis A in China in 1988 affected some 292 000 persons (with 32 fatalities), and was related to consumption of contaminated clams. Food contaminated by food-handlers and not subsequently sufficiently heated may also transmit the disease. Many cases of hepatitis A are known to be linked to restaurants.

Soilborne infections

Diseases that come from the soil affect several million people annually. The most deadly of these diseases is neonatal tetanus, responsible for the deaths of at least 450 000 children every year, while intestinal worm infections are the most widespread.

Tetanus can affect all age groups but is a problem particularly for newborns and their mothers. It is a bacterial disease, but it does not spread from one individual to another. It occurs through the infection of a wound by the tetanus bacillus, the incubation period varying between 4 and 21 days.

Neonatal tetanus occurs as a result of contamination of the umbilical cord with tetanus spores at birth, caused by unsterile methods of handling or cutting the umbilical cord or dressing it with germ-laden substances such as ash, mud or animal dung (common practices in many areas of developing countries).

Treatment of neonatal tetanus is difficult and generally unsuccessful, and almost all newborn babies affected die. The disease can be prevented by immunizing women of reproductive age (especially pregnant women) with tetanus toxoid and by ensuring hygienic delivery and cord care practices in institutions and at home.

In the early 1980s, between 800 000 and 1 million newborns were estimated to die of neonatal tetanus every year (up to 25% of infant deaths in many developing countries). In some countries, the annual incidence was over 60 per 1 000 live births. By 1994 the number of deaths had fallen to around 480 000 annually. The decline of more than 700 000 cases was mainly the result of a significant increase in immunization coverage of pregnant women with a protective dose of tetanus toxoid between 1989 and 1994, from 27% to 48% respectively (60% excluding China). Intensified immunization of women of childbearing age in selected high-risk areas also contributed to the rapid decline in reported cases observed since 1990.

Cases of neonatal tetanus do not occur evenly throughout the world. Twenty-six countries, many of them in Africa, accounted for more than 80% of the estimated global neonatal tetanus cases in 1994. Within countries, cases tend to occur in clusters in areas with poor hygiene during childbirth, harmful traditional practices and low levels of immunization coverage of women.

In 1989, WHO's Member countries decided to eliminate neonatal tetanus as a public health problem by aiming to reduce its incidence to less than 1 case per 1 000 live births for each health district. If they succeed, 1 million newborn deaths and 50 000 maternal deaths due to tetanus will be avoided each year.

Of all soilborne diseases, ***intestinal parasitic infections*** caused by worms account for by far the greatest proportion. Those caused by hookworm, roundworm and whipworm predominate. WHO estimates that as many as 3.5 billion people are infected by worms, and that at any time some 450 million people, most of them children, are ill as a result. The number of those affected is increasing, and cases occur in all WHO regions.

While most of these conditions amount to no more than diarrhoea and abdominal pain, they can be fatal. It is estimated that in 1995 hookworm infection killed 65 000 people and roundworms killed 60 000. Chronic infections impair the physical and mental growth, nutrition and development of children in general and girls and young women in particular.

The infections are spreading rapidly in slums, shanty towns and squatter settlements in and around many cities in developing countries. Poor sanitation, and consequent contamination of the environment with human excreta are among the commonest hazards contributing to transmission. Soil is the breeding ground, when contaminated by infected individuals defecating on open spaces.

The eggs of roundworms (*Ascaris lumbricoides*), whipworms (*Trichuris trichiura*) and hookworms, the most common soilborne parasites, need to remain in the soil for a certain period before they become infective. The contaminated soil may then be carried long distances on feet or footwear into houses and thereby into contact with people. Transmission may occur directly from the soil through the mouth or skin, or in some cases from person to person.

Apart from the symptoms described above, iron deficiency anaemia is a frequent result of hookworm infection, especially in children and pregnant women. WHO estimates that at any time, about 44 million women are both pregnant and infected with hookworms.

Preventing and controlling foodborne, waterborne, and soilborne diseases

So much depends on how communities deal with human faeces. At least 2.5 billion people in developing countries lack an adequate system for disposing of their faeces. For the poor in many developing countries, faeces deposited near their homes constantly threaten household hygiene, by direct contact with people or by being inadvertently carried into homes and kitchens by children, domestic animals or insects. Domestic, neighbourhood or district water supplies such as wells, tanks and reservoirs may be contaminated by poorly designed or maintained sewage disposal systems.

The cleanliness of the water is not the only issue; the importance of an adequate water supply for household hygiene cannot be overemphasized. Washing hands after defecation and before preparing food is fundamental to controlling diseases, but even if this

1 million newborn deaths and 50 000 maternal deaths due to tetanus could be avoided each year.

principle is understood fully, handwashing is impossible without sufficient water.

Improving the quality of drinking-water, ensuring proper sewage disposal and providing more water for both personal and domestic hygiene are the keys to the prevention or control of major scourges such as diarrhoeal diseases (including cholera), typhoid, guinea-worm disease, schistosomiasis and giardiasis. The latest estimates, relating to the developimg world for 1995, indicate that about 25% of the population do not have access to safe water, and over 66% lack adequate sanitation.

Box 9. Cleaning up dirty water and keeping it clean

In many parts of the developing world, drinking-water is collected from sources outside the home and is then held in household storage vessels. It may be contaminated at the source or during storage; strategies to reduce waterborne disease transmission must safeguard against both possibilities. New disinfectant generators and better designs for storage vessels allow families to disinfect drinking-water immediately after collection (point-of-use disinfection) and to store treated water in narrow-mouthed, closed vessels designed to prevent recontamination (safe storage). This two-component prevention strategy is a practical and inexpensive way for households and communities that lack safe water to protect themselves against a variety of waterborne pathogens, and can thus greatly decrease waterborne diarrhoeal disease.

Several field tests have already been carried out in various parts of Bolivia by the Ministry of Health, CDC, PAHO and USAID. The proposed method was very well accepted, and significant improvements in the quality of the stored water were observed, as well as a decrease in diarrhoeal disease (especially among infants under 1 year old).

The evidence to date suggests that this intervention strategy is a practical means of preventing waterborne diseases such as typhoid fever and cholera. Apart from bringing a readily-available source of treated water into the home, the strategy can be successfully applied to other settings such as day-care centres and old people's homes, and used during festivals.

Families are encouraged to use disinfected water for washing hands, foods, and kitchen utensils and for food preparation, all of which may reduce the incidence of diseases transmitted through personal contact and those transmitted by contaminated foods. Even diseases such as dengue that rely on mosquito vectors may be reduced if open water storage containers are eliminated from the household environment. The strategy lends itself well to other settings: clinics, schools, and even street vendors are attractive potential targets for this intervention. The next generation of vessels, currently being pilot-tested among Guatemalan street vendors, have a built-in soap dish, making them even more effective platforms for promoting hand-washing. With the commitment of communities and ministries of health, UN agencies, nongovernmental organizations and private industry, this low-cost, effective intervention could be implemented on a broader scale.

Source: United States Centers for Disease Control and Prevention (personal communication).

Technological advances in water supply, sanitation, drainage and solid waste management in recent years offer cost-effective solutions that can be adapted to local circumstances and can greatly improve health and environmental conditions. Personal hygiene is immensely important in the prevention of contamination of food and drinking-water. The provision of a safe and adequate water supply requires partnership between communities and the organized public and private sectors, including NGOs. Government ministries concerned with education, development and industry have a major role to play. Communities can also take local initiatives for the provision of safe water, as demonstrated in Bolivia (Box 9).

Deaths due to ***diarrhoeal diseases*** are particularly tragic because the great majority can be avoided by the prevention or treatment of dehydration, as the primary cause of death from acute diarrhoea is dehydration from the loss of fluids and electrolytes. Correct case management, both at home and in health facilities, can achieve immediate reductions in mortality from acute epidemic and non-epidemic diarrhoea in any age group. This is achieved through the prevention of dehydration in the home by providing increased amounts of fluids and continuing to provide food or breast milk. Dehydration can be treated through the use of oral rehydration salts, and the use of intravenous fluids for severe dehydration. Antibiotics should be used only for dysentery and severe cases of cholera.

Outbreaks of ***giardiasis*** can also be prevented by adequate filtration and treatment of water supplies. The illness itself can be treated with drugs, but control measures have been hampered by lack of knowledge about the biology and natural history of the giardia organism. There is increasing evidence that its natural host is to be found among animals.

Cholera, which is definitively linked to poverty, is likely to occur when there is overcrowding coupled with lack of adequate sanitation and safe drinking-water. Therefore the best long-term strategy to prevent cholera is elimination of the factors that favour its transmission, especially by improving water supplies and sanitation.

The treatment of patients with rehydration therapy is the cornerstone of public health efforts to reduce cholera deaths. During acute emergencies, providing clean drinking-water, basic sanitation and safe disposal of human waste are high-priority preventive interventions. Immunization is unlikely to be useful in epidemics.

Safe drinking-water systems and adequate sewage disposal facilities are essential for the prevention of ***typhoid***. Scrupulous cleanliness is necessary in food preparation and handling, as is proper storage of salads and other food served cold.

A vaccine exists, but it does not give complete protection. Because of the increasing emergence of multiresistant bacterial strains, there is a greater need for longer-lasting, more effective vaccines. Research in this field is continuing.

Treatment of ***schistosomiasis*** has been revolutionized in the last 20 years with the use of three very effective drugs – praziquantel, oxamniquine and metrifonate – which are now included in WHO's Model List of essential drugs. Modern diagnostic techniques are simple, easy to apply and cost very little. In addition, improvements can also be achieved by reducing exposure to contaminated water and providing water which is free from parasites for drinking, bathing and washing clothes.

Dracunculiasis (guinea-worm disease) can be completely prevented by: providing safe sources of drinking-water; health education and the use of cloth filters (for water); encouraging infected persons not to enter drinking-water sources when the worm is emerging, thereby preventing transmission; chemically treating unsafe water with temephos once a month during the transmission season, under selected conditions.

The enormous health, social and economic benefits of the eradication programme are already being realized. For example, 40% increases in food production in some areas have followed reductions in cases of the disease. Areas under cultivation by farmers have increased by 25%, and school absenteeism has dropped from 60% to 13% in some areas.

An International Commission for the Certification of Dracunculiasis Eradication was created in 1995 and country-by-country certification procedures will begin in 1996 under WHO's guidance.

The prevention and control of ***foodborne infections*** depends on improving the hygienic quality of raw foodstuffs at the agricultural level; applying food processing technologies such as pasteurization, sterilization, fermentation or irradiation; and, most critically, educating food-handlers in the principles of safe food preparation. Education of consumers and food-handlers is vital for the prevention of diarrhoeal diseases.

A vaccine for ***hepatitis A*** is available and is recommended for food-handlers. But because of its high cost, its use has not been widely promoted.

Here too, intersectoral cooperation is essential. Without it, health promotion and disease prevention cannot make headway. The responsibility for providing safe food should be shared between governments and the food industry, from producers to retailers.

Tetanus can never be eradicated because the spores which cause it will always remain in the environment to pose the risk of infection. But it can be eliminated as a public health problem – which means reducing its incidence to less than 1 case per 1 000 live births in each health district where it occurs. This requires immunization of pregnant women and all women of childbearing age in high-risk areas. Hygienic childbirth practices are also a key element of prevention, and are being promoted through a WHO "clean delivery" campaign.

Babies born to immunized mothers have a natural immunity to tetanus for up to 12 weeks. Women need two doses of vaccine to gain up to three years' protection, and five doses to cover all their

Safe drinking-water systems and adequate sewage disposal facilities are essential for the prevention of typhoid.

childbearing years for maximum immune response.

The probable number of women living in high-risk areas who need three doses – which give five years' protection – is 55 million. The estimated cost of immunizing them all is $84 million – equal to $1.53 per woman.

If world efforts to immunize infants with three doses of DPT are maintained, reinforcing infant immunization with a fourth dose of DPT at 15 to 24 months prolongs tetanus immunity for another five years. A fifth dose of tetanus toxoid (given as Td or DT vaccine) at school entry will provide immunity for another 10 years. An additional dose when leaving school will ensure sufficient immunity for all childbearing-age years.

Scientists are trying to develop a slow-release tetanus vaccine which can ensure solid and long-lasting immunity with one injection. This could substantially cut costs and raise immunization coverage. But research is still at an early stage and it will be some years before such a vaccine becomes available.

Meanwhile, the goal of global elimination of neonatal tetanus will not be achieved unless many developing countries give higher priority to tetanus immunization programmes, and international donor agencies provide additional funding.

In a perfect world there would be adequate sanitation for all and shoes for everybody. In the real world, neither applies, and controlling rather than eliminating soilborne ***intestinal parasitic infections*** will remain the realistic goal until they do apply.

WHO promotes the regular use of single-dose, safe, cheap and effective drugs to combat the effects of intestinal worm infections. Research shows that in populations at risk, most of the worms are harboured by a small part of the population. This implies that it is most cost-effective to identify and treat the group that is most heavily infected.

Recent WHO studies in Zanzibar (United Republic of Tanzania) indicate that regular anthelminthic treatment with mebendazole (2.8 US cents a dose) significantly improves the iron status of schoolchildren.

In areas where there is a high risk of hookworm infection and where many women have anaemia, WHO recommends that specific anti-hookworm chemotherapy should be included in strategies designed to improve the health, development and nutritional status of girls and women.

Of all the insects that transmit disease, the mosquito represents by far the greatest menace.

Insect-borne diseases

Flourishing in conditions of heat and humidity, poverty and overcrowding, insects spread deadly and disabling diseases among almost half of the world's population. They prey particularly on small children, killing more than a million of them every year. They lay vast areas of land to waste, preventing productive settlement, destroying agricultural potential, and blighting whole communities and regions.

The enormous variety of insect species includes numerous carriers of different diseases, and there can be no common approach to preventing or controlling them. Sleeping sickness, for example, is transmitted by the tsetse fly, with 55 million people at risk. The leishmaniasis group of diseases is spread by sandflies, putting 350 million people at risk. Another 100 million people in Latin America are at risk of Chagas disease, which is spread by household bugs. River blindness is carried by blackflies, and plague is carried by fleas, with millions of people at risk of infection.

The mosquito: public health enemy number one

But of all the insects that transmit disease, the mosquito represents by far the greatest menace. It remains mankind's most indomitable foe, resisting costly efforts to eradicate or even control it.

The mosquito is the vector for different diseases such as malaria, dengue fever and yellow fever, which together cause several million deaths, and hundreds of millions of cases every year. Mosquitos also spread lymphatic filariasis (elephantiasis), which infects about 120 million people; and Japanese encephalitis, which takes its biggest toll among children.

Different species of mosquito are involved in the transmission of different diseases, each with its own particular habits: some feed by day and others by night; some prefer to feed indoors and others prefer to do so outside; some rest after feeding and others depart; some prefer to feed on humans and others on animals; and various species choose different places for laying their eggs. Mosquito control requires a knowledge of these habits.

Today, the mosquito is literally spreading its wings as a carrier of disease and settling in new areas far from its original geographical boundaries. Some of the reasons – international travel, trade and migration – have already been outlined in the introduction to this chapter. In addition, expanding agriculture, the clearing of forests or the building of dams and irrigation schemes, and unplanned urban development provide mosquitos with new breeding grounds, while at the same time bringing more people into contact with them. Changes in climatic conditions are enabling mosquitos and other disease-carrying insects to survive and breed at more northern latitudes and higher altitudes.

One example illustrates the role of international travel and trade. The Asian tiger mosquito, which can transmit deadly strains of encephalitis virus as well as dengue and yellow fever, has been introduced into the United States, Brazil and parts of Africa in cargoes of rubber vehicle tyres shipped from Asia. In the United States alone, this mosquito is established in at least 23 states, and can survive winters as far north as Chicago.

Malaria is endemic in 91 countries, with about 40% of the world's population at risk. Each year there are 300-500 million clinical cases of malaria, 90% of them in Africa, and between 1.5 million and 2.7 million deaths. Among all infectious diseases, malaria continues to be one of the biggest contributors to disease burdens in terms of deaths and suffering. By undermining the health and capacity to work of hundreds of millions of people, it is closely linked to poverty and contributes significantly to stunting social and economic development.

Malaria continues to be one of the biggest contributors to disease burdens in terms of deaths and suffering.

In many parts of the world, malaria is becoming an even greater problem than before. Epidemics are recurring in areas where transmission had been interrupted, and are generally associated with deteriorating social and economic conditions.

Malaria is a febrile disease caused by the four species of human malaria parasites belonging to the genus *Plasmodium* and naturally transmitted to people by the bite of an infected female mosquito of the genus *Anopheles*. Early symptoms include fever, shivering, aches and pains in the joints and headache. In falciparum malaria, infected red cells can obstruct the blood vessels of the brain, causing cerebral malaria, which is often lethal. Other vital organs can also be damaged, with fatal consequences.

Forty years ago there were hopes that malaria would be eradicated in a fairly short time, mainly through the intensive use of insecticides. However, malaria still remains a serious threat in endemic countries today.

Those at greatest risk of dying from the disease are children under age 5 in malaria-endemic areas; pregnant women; people moving from non-malarious to malarious zones for reasons of work, migration, refuge, war or tourism; and travellers who visit endemic countries and return home with the disease.

WHO's global malaria strategy (which is intended to prevent mortality, reduce morbidity and lead to a decrease in social and economic loss) consists of providing early diagnosis and prompt treatment; planning and implementing selective and sustainable preventive measures, including vector control; detecting early, containing or preventing epidemics; and strengthening local capacities in basic and applied research to permit and promote the regular assessment of a country's malaria situation, in particular the ecological, social and economic determinants of the disease.

Dengue affects more than 100 countries in all continents except Europe, and is spreading rapidly in many areas.

The main problems in malaria control are shortages of resources and resistance to pesticides and drugs.

Dengue fever, a severe influenza-like illness, and ***dengue haemorrhagic fever*** are closely-related conditions caused by four distinct viruses transmitted by *Aedes aegypti* mosquitos. Dengue is the world's most important mosquito-borne virus disease. A total of 2 500 million people worldwide are at risk of infection. An estimated 20 million cases occur each year, of whom 500 000 need to be hospitalized. There is no cross-immunity, which means that an individual who has recovered from one remains susceptible to the other three. The haemorrhagic form of dengue (DHF) most often occurs in individuals who have previously had the infection but are infected again with a different virus type, although DHF may occasionally occur after one primary infection. The viruses move continuously between crowded urban centres, causing massive outbreaks of disease.

Dengue, and especially dengue haemorrhagic fever, cause severe headache and pain behind the eyes which worsens with movement; patients have a high fever and muscle and joint pains. In the haemorrhagic form, there is bleeding from the nose, mouth, and gums, excessive thirst and difficulty in breathing. There is no cure and as yet no vaccine.

Dengue affects more than 100 countries in all continents except Europe, and is spreading rapidly in many areas. It flourishes in conditions of poor housing, overcrowding, and inadequate sanitation, especially in cities in tropical and subtropical regions of the Americas, Asia, Africa and the Western Pacific, and in communities where there is accumulation of solid waste, especially discarded containers and tyres where mosquitos breed.

In 1995, the worst dengue epidemic in Latin America and the Caribbean for 15 years struck at least 14 countries, causing more than 200 000 cases of dengue fever and almost 6 000 cases of dengue haemorrhagic fever. There was only limited dengue in the western hemisphere until 1981, when the first outbreak occurred in Cuba.

Dengue epidemics are increasing due to growing urban populations, expanding mosquito breeding sites and rapid transportation which involves both the movement of infected people and the spread of dengue-carrying mosquitos.

Many major cities of the world are at risk of potentially devastating epidemics of ***yellow fever***. This mosquito-borne virus disease occurs in tropical regions of South America and Africa, and is maintained in a transmission cycle involving forest-dwelling mosquitos and monkeys, often referred to as the "jungle yellow fever" cycle. Many major cities, especially in the Americas, are heavily infested with *Aedes aegypti* mosquitos, and should yellow fever virus be introduced and transmission initiated, thousands of cases and deaths could occur in spite of the availability of a protective vaccine.

Yellow fever is characterized by sudden onset, fever, chills, headache, backache, generalized muscle pain, prostration, nausea and vomiting. Jaundice is moderate in the early stages but intensifies later. As the disease progresses, the pulse becomes slower and weaker, and haemorrhages may occur. The death rate ranges from less than 5% to more than 50% during epidemics.

The incidence of yellow fever is greatest in parts of western Africa, including Ghana, Nigeria, and adjacent countries, and in northern South America, especially Peru, Bolivia, Brazil and neighbouring countries. Rural populations are at greatest risk, with most cases occurring among young adult males who enter the forests as part of their work.

Like many other insect-borne diseases, yellow fever is spreading. The largest number of cases for 40 years was reported during 1988-1990; this was followed in 1992 by the first epidemic of yellow fever recorded in Kenya (*Box 10*). In 1995, Peru also suffered its worst-ever outbreak, with 440 cases in the first six months of the year – the highest number recorded in the Americas since 1950. WHO estimates that there are probably some 200 000 cases and 20 000 deaths a year from the disease.

Japanese encephalitis is another mosquito-borne virus disease. Its transmission cycle involves wild birds and domestic pigs as amplifying hosts, and the most common mosquito vector is *Culex tritaeniorhyncus*, which is associated with rice-growing regions. In recent years, the disease has appeared to spread into new parts of Asia, perhaps as a result of increased rice field agriculture.

Most infections are asymptomatic, with only one in a few hundred infections leading to clinical illness. Mild cases are often characterized by febrile headache or aseptic meningitis. Severe infections are usually characterized by acute onset, headache, high fever, disorientation, coma, convulsions (especially in infants), and spastic paralysis. Among the severe cases, fatality rates may reach 60%.

An estimated 43 000 cases of Japanese encephalitis occur globally each year, with 11 000 deaths and nearly 9 000 disabled. The vast majority of cases (about 85%) occur among children less than 15 years of age. Nearly 10% of the cases are among those over 60 years, perhaps reflecting waning protective immunity. About three-quarters of the cases occur in the Western Pacific, primarily China and adjacent countries, with the remainder occurring in South-East Asia, especially India. The disease is rare in other parts of the world, and when seen, is generally associated with travellers returning from endemic areas.

Lymphatic filariasis or elephantiasis – the grotesquely disfiguring disease affecting the legs, arms and genitals – is the most notorious result of infection with filarial parasites transmitted by *Culex* mosquitos. About 120 million people are infected in tropical areas of Africa (40 million), India (45 million), South-East Asia, the Pacific Islands, and South and Central America.

Lymphatic filariasis also causes acute fevers, inflammation of the lymphatic system, and the bronchial-asthmatic condition known as "tropical pulmonary eosinophilia".

Diseases spread by other insects

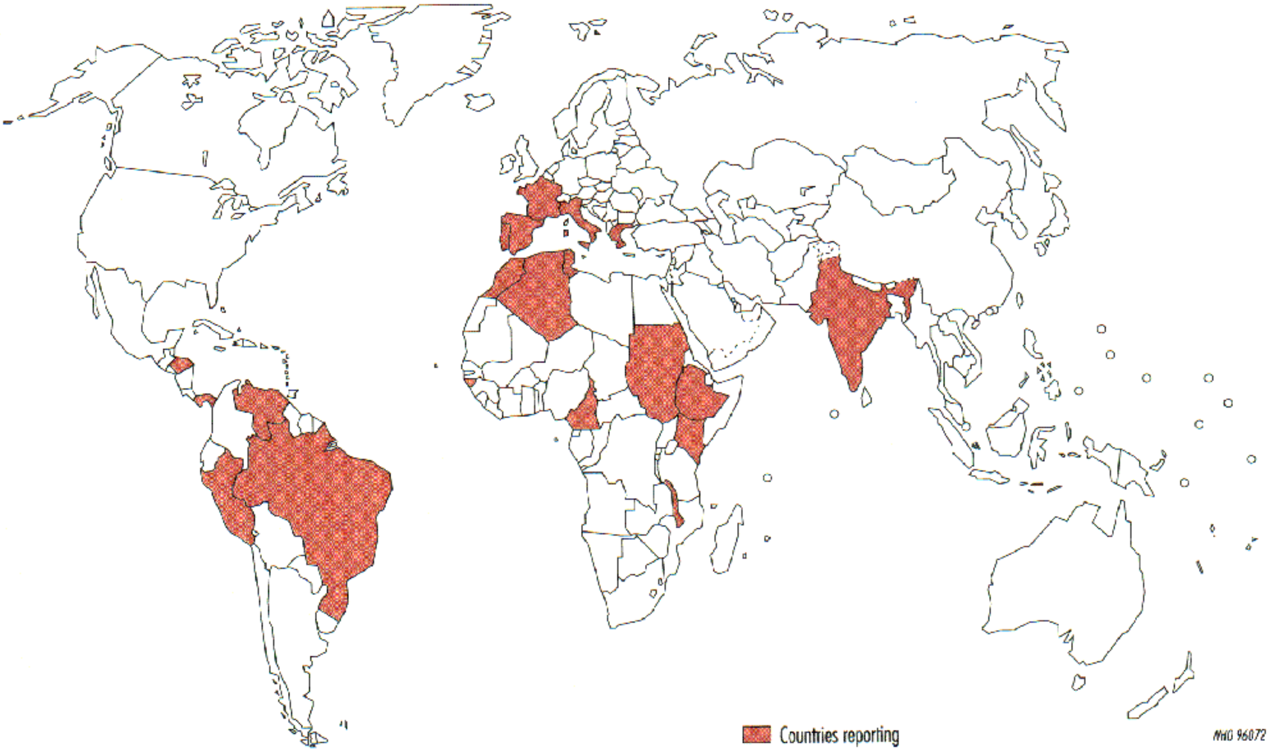
Although 350 million people in 88 countries are at risk of ***leishmaniasis***, much of the rest of the world knows little about the disease, so its victims are largely unnoticed outside their homelands. Leishmaniasis is a grossly disfiguring disease as well as a potentially deadly one. As a result, many sufferers, particularly women and children, are social outcasts, victims of prejudice and stigmatization.

Leishmaniasis, named after Leishman, the doctor who identified the causative organism in 1901 when treating patients in India, exists in various

Box 10. Yellow fever in Kenya

The first yellow fever outbreak reported from Kenya since 1943 began in September 1992 and continued until March 1993. Although only 54 cases and 28 deaths were reported, the outbreak attracted worldwide attention because of Kenya's tourist industry and the fact that this disease appeared to be newly emerging there. The outbreak was controlled by administering nearly 1 million doses of yellow fever vaccine, in an effective display of international collaboration. It subsequently became clear that there were significant shortcomings in the national capacity to address a disease problem of this nature. Although Kenya is clearly marked as being in the yellow fever endemic zone, many years without a case had led to complacency. Clinicians did not think of yellow fever in their differential diagnosis, and if they did, the laboratory support necessary to confirm a diagnosis was not reliable, and formal surveillance did not exist to document previous cases. Consequently, a collaborative effort was begun to strengthen yellow fever capacity: two Kenyan virologists from the Kenya Medical Research Institute (KEMRI) were trained at the Centers for Disease Control and Prevention (CDC) in the United States in modern yellow fever diagnostic techniques; the Government of the Netherlands provided assistance in the development of an active yellow fever surveillance programme; and clinicians working in the outbreak area received guidance in yellow fever diagnosis and reporting. Beginning in 1994, an active yellow fever surveillance programme was initiated, supported by prompt laboratory confirmation of suspected cases. As a result, continued low-level yellow fever transmission was clearly documented, indicating that the virus continued to be transmitted among wild animals and local mosquitos, occasionally infecting humans who had not been vaccinated during the mass campaign. When the Kenyan Ministry of Health was informed of the situation, it promptly added yellow fever vaccine to the regional Expanded Programme on Immunization. In addition KEMRI, in collaboration with WHO and CDC, hosted representatives from other African virology laboratories at a workshop for laboratory diagnosis of yellow fever. Participants were given two weeks of intensive laboratory training, and provided with yellow fever diagnostic kits for use in their own countries. Thus the challenge of the emergence of yellow fever in Kenya was met head-on and became the entry-point for developing an effective surveillance system able to respond to other infectious disease emergencies, by combining public health intervention, infrastructure building and strong international collaboration.

Map 7. Leishmania/HIV co-infection, 1995



forms, all due to parasites spread by the bites of many different species of sandfly.

The most serious form, *visceral* leishmaniasis – also known as kala-azar – can have a fatality rate as high as 100% if untreated. It is characterized by irregular bouts of fever, substantial weight loss, swelling of the spleen and liver, and anaemia. Nine out of ten cases occur in Bangladesh, Brazil, India and Sudan.

Another form, *mucocutaneous* leishmaniasis, can involve partial or total destruction of the mucous membranes of the nose, mouth and throat cavities and surrounding tissues. Ninety per cent of these cases occur in Bolivia, Brazil and Peru.

The commonest form, *cutaneous* leishmaniasis, produces skin ulcers, sometimes as many as 200 on the face, arms and legs, leaving permanent scars. Nine out of ten cases occur in Afghanistan, Brazil, Islamic Republic of Iran, Peru, Saudi Arabia and Syrian Arab Republic.

Over the last 12 years, there has been a sharp increase in the recorded number of leishmaniasis cases, reflecting the geographical spread of the disease; WHO estimates that about 1.8 million new cases occur every year globally.

The spread of the disease is accelerated by development programmes such as road building, dam construction, mining and forest exploitation that bring increasing numbers of people into contact with the disease vectors. Another factor enhancing spread is the haphazard growth of major urban centres which creates conditions that increase transmission risks. A third factor is the movement between countries or regions of migrant workers who themselves act as vehicles for the disease. A fourth factor is the halting or winding down in some countries of malaria control campaigns using insecticide sprays which were directed against mosquitos, but which were also effective against other insect vectors. For instance, leishmaniasis almost disappeared from India in the 1960s because sandflies were reduced as a side-effect of DDT spraying to control malaria. But when the spraying stopped, the flies and the disease returned.

Visceral leishmaniasis (VL) is spreading in several areas of the world due to epidemiological changes which sharply increase its overlapping with AIDS (*Map 7*). Leishmania/HIV co-infection is considered to be a real "emerging disease", especially in southern Europe where 25-70% of VL cases in adults are related to HIV and 1.5-9% of AIDS patients suffer from newly acquired or reactivated VL (*Box 11*).

Sleeping sickness (African trypanosomiasis) is caused by parasites called trypanosomes, transmitted to humans through the bite of a tsetse fly. This fly is found only in certain parts of Africa. It feeds on the blood of animals and humans, acquiring or transmitting infection as it feeds. Following transmission, the trypanosomes proliferate and gradually invade all the organs of the body.

In the early stage, the main clinical signs are high fever, weakness and headache, joint pains and itching. Gradually, the initial symptoms become more pronounced and other manifestations appear, such as anaemia and cardiovascular and kidney disorders. Later, when the parasites invade the central nervous system, the disease takes a dramatic turn. The patient's behaviour changes; he or she can no longer concentrate and becomes indifferent to or exasperated by everything. Sudden and completely unpredictable mood changes become increasingly frequent. The patient is then overcome by extreme torpor, insomnia, and exhaustion, leading to deep coma and death.

Pain, suffering and death from sleeping sickness threaten more than 55 million people in 36 countries of sub-Saharan Africa. When untreated this disease progresses until it gives no respite from suffering, day or night, and ends in death. If transmission is high the effect is dramatic: whole villages are abandoned. Exclusively a rural disease, sleeping sickness smoulders steadily except for occasional epidemics, and usually has low political visibility.

Box 11. Leishmaniasis and HIV

Co-infection of visceral leishmaniasis (VL) and AIDS is emerging due to the spread of the AIDS pandemic in suburban and rural areas of the world. Meanwhile, it is estimated that 500 000 new clinical cases of VL occur annually, and 200 million people live in endemic areas. The disease is endemic in 62 countries and is spreading in several new areas owing to epidemiological changes.

Leishmania/HIV is considered to be an "emerging disease" especially in southern Europe, where 25-70% of adult VL cases are related to HIV infection, and 1.5-9% of AIDS patients suffer from newly acquired or reactivated VL. In this area, VL is the most frequent opportunistic parasitic infection. Furthermore, in the foci of southern Europe, 70% of co-infected patients are intravenous drug users and, consequently, the age distribution of the patients has changed drastically. Up to 20-25% of the population living in an endemic area may be infected, but without showing symptoms for years. However, the disease quickly appears when immunity is affected.

In 1995, the total number of leishmania/HIV co-infections in the Mediterranean area was estimated at over 1 000 cases. Most of the co-infections reported in the Americas occur in Brazil. Leishmania/HIV co-infections were also reported in Africa from Cameroon, Ethiopia, Guinea-Bissau, Kenya, Malawi and Sudan. In Asia, the first cases of leishmania/HIV co-infection were recently reported from India.

To better understand this new phenomenon, WHO created a network of 14 institutions in 10 countries, to collect standardized information in a central international registry, and is currently analysing data on 700 retrospective cases.

Sleeping sickness causes immense mental suffering, with early symptoms such as sleep disturbance and psychosis. Of the disease's two forms, the western African "gambiense" form begins with a fever and then develops slowly, killing its victim only several years later. The eastern and southern African "rhodesiense" form is more acute. Severe symptoms begin within a few days, and death occurs in a few weeks to a year.

The countries currently most seriously affected by gambiense sleeping sickness are: Angola, Cameroon, Central African Republic, Chad, Congo, Sudan, Uganda and Zaire. The rhodesiense disease affects the United Republic of Tanzania most, followed by Malawi, Mozambique and Uganda. It is also endemic in Ethiopia and Zambia, but little is known about its prevalence in those countries.

River blindness (onchocerciasis) is the most dreaded but not the only sequel of infection with the filarial worm

Onchocerca volvulus, which affects some 17.6 million people in Africa, and a smaller number in Central and South America. The parasite is transmitted by blackflies that breed in fast-flowing rivers and, like the parasites of lymphatic filariasis, mature into adult male and female forms in the human host. However, rather than settling into the lymphatic system, adult worms settle into visible lumps or nodules under the skin. Then, as in other filarial disease, for some 10-14 years the female parasite produces millions of microfilariae, which in onchocerciasis invade the skin and the eye, rather than remaining in the blood.

In the skin, microfilariae cause almost unbearable itching and eventually destroy skin elasticity, texture and appearance; in the eye, over time they can destroy the retina and make the cornea and lens opaque. Key factors determining the outcome are the intensity of transmission and infection and the species of worm involved: some species are mainly responsible for blindness and others for itching and other skin manifestations.

The latest evidence suggests that incidence of plague is on the increase.

Onchocerciasis affects 17.6 million people, of whom 15 million, or more than 85%, now live outside the 11-country region of the Onchocerciasis Control Programme in West Africa. Throughout the region covered by the Programme, the disease is under control as a public health problem, but outside the region, onchocerciasis remains a major cause of blindness in the central and eastern parts of the savanna belt of the tropics, including parts of Cameroon, the Central African Republic, Chad, Nigeria and Sudan – areas where some 6.5 million people are infected.

In other endemic areas of Africa – where 8.6 million people are infected – the disease causes severe skin problems and other systemic consequences.

Onchocerciasis is still endemic in six countries of the Americas but new foci have been found and the disease may spread still further as infected workers continue to exploit areas of virgin forest. The situation is also complicated by the presence of large numbers of human-biting blackflies in areas from which onchocerciasis is at present not reported. However, studies over the last decade have indicated that while the geographical borders of the southern focus of the disease have been extended, the epidemiological characteristics have remained stable. Concentrated efforts were made to control the disease in areas where it is endemic through coordination of ivermectin distribution activities. A conference held in 1991 resulted in the launching of a regional onchocerciasis elimination programme to reduce morbidity through the mass distribution of ivermectin in Brazil, Colombia, Ecuador, Guatemala, Mexico and Venezuela, integrated with other measures such as hepatitis B vaccination of children, and the use of primary health care workers. In accordance with a strategic plan of action, a multinational, multiagency and multidonor coalition was formed to support activities for eliminating onchocerciasis as a public health problem.

Plague is often regarded as a scourge of medieval times, from which the world is now largely free. But the latest evidence suggests that incidence of the disease is on the increase. During 1995, at least 1 400 cases of human plague (including at least 50 deaths) were notified to WHO. The disease occurs particularly in rodents. It spreads from rat to rat and from rats to humans mainly by rat fleas biting first a sick rat and then a person, thus transmitting *Yersinia pestis*, the bacterium of the disease.

Plague most commonly has two forms: bubonic and pneumonic. The more frequent form is bubonic, in which there is a sudden onset of severe malaise, headache, shaking chills, fever and pain in the affected regional lymph nodes. Large and painful lumps appear under the skin, called buboes. The more dangerous form of the disease is pneumonic or pulmonary plague, which affects the lungs and can be transmitted from person to person by droplets in the air from sputum discharged by the infected individual.

Some countries in Africa, the Americas and Asia report cases almost every year: Madagascar, United Republic of Tanzania and Zaire in Africa; Bolivia, Brazil, Peru and the United States in the Americas; and China, Kazakhstan, Mongolia, Myanmar and Viet Nam in Asia. However, cases occur in areas that had apparently been free from the disease for many decades. For example, it has reappeared in Botswana, India and Malawi in recent years after "calm" periods of up to 30 years. Peru experienced a large outbreak of plague in 1984, followed by another in 1990 and again in 1992. These outbreaks are linked to cyclical epidemics of plague in rodents.

Over the last 20 years, the mean annual global plague case fatality rate has been 9%, ranging from just over 14% in Africa to just under 6% in the Americas. These high rates persist despite the availability of highly effective drugs against the disease.

Other factors are involved in the apparent increase in plague. In the United States, for example, rapid suburbanization has resulted in increasing numbers of people living in or near areas where plague exists in nature. The number of states of that country reporting plague cases increased from three during 1944-1953 to 13 during 1984-1994. Surveillance of plague in rodents indicates that the disease has spread eastwards in the United States to areas believed to have been free of plague during the previous 50 years.

Chagas disease (American trypanosomiasis) is a severe, disabling and potentially fatal disease caused by the parasite *T. cruzi* which is harboured by both domesticated and wild animals. The parasites are mainly transmitted to humans by a blood-sucking triatomine bug, usually found in poor housing and living conditions. It is also transmitted at birth from infected mothers to their babies and through transfusions of blood infected with the parasites. It occurs only in the Americas and is widespread in rural zones from Mexico to Argentina, with heavy concentrations in Argentina, Brazil, Chile and Venezuela. Cases are also reported in Mexico, Peru and most other Central and South American countries as well as in the Caribbean Islands and the United States. Some 100 million people are at risk of contracting the disease, and at least 18 million people are infected. More than a third of those infected develop chronic Chagas disease, and about 30% of these become incapacitated due to cardiac damage which may also lead to sudden death. Others suffer digestive damage and peripheral nervous impairments. More than 2 million people already have complications, and 45 000 people a year die. Chagas disease is the leading cause of cardiac death among young adults in parts of South America.

No treatment is available for the chronic forms of the disease. Oral drugs such as nifurtimox and benznidazole are used in acute cases but their efficacy varies considerably from place to place, probably due to variations in parasite strains. The infection can be effectively eliminated through interruption of transmission via triatomine bugs through regular spraying with residual-action insecticides and the systematic screening of blood donors.

Chagas disease is the leading cause of cardiac death among young adults in parts of South America.

Preventing and controlling insect-borne diseases

The five main diseases spread by mosquitos – malaria, dengue, yellow fever, Japanese encephalitis and filariasis – do not lend themselves to a single, comprehensive approach. Each has to be tackled in its own right. At the same time, however, some methods of prevention or control are common to all of them.

Vaccines against yellow fever and Japanese encephalitis already exist, and others are being developed against malaria and dengue, although it will be several years at least before they become available. There is an effective drug against filariasis.

The two key measures to prevent the spread of these five diseases are the elimination of mosquito breeding places and the prevention of mosquito bites. The first involves community action, such as covering water storage containers and removing discarded containers from inside and around houses; house-to-house inspection; and control programmes using insecticide sprays.

The second involves people protecting themselves with insecticide-impregnated materials such as curtains and nets, repellents and screens.

Vector and disease surveillance are extremely important, as are rapid intervention and control when an outbreak occurs. Other important measures are health education campaigns and preparations to guard against outbreaks.

Following high-level political commitment for a Global Malaria Control Strategy made in 1992 at a Ministerial Conference in Amsterdam, a target was set for achieving a reduction in ***malaria*** mortality of at least 20% by the year 2000 in at least 75% of affected countries. In 1994, the United Nations General Assembly called upon WHO, as the lead agency for health, to promote the international mobilization of technical, medical and financial assistance to intensify the struggle against malaria.

Drugs such as mefloquine and halofantrine have been developed and registered, and artemisinin derivatives developed and brought close to registration.

In Africa, large-scale multicentre trials of the effectiveness of insecticide-treated bednets have demonstrated a dramatic reduction in mortality of children under the age of 4. These research-based results are now being translated into operational recommendations for national control programmes.

Worldwide efforts in basic research in malaria vaccines are at last beginning to bear fruit.

Worldwide efforts in basic research in malaria vaccines are at last beginning to bear fruit. In the United Republic of Tanzania in 1994 a double-blind phase III trial of the Colombian SPf66 peptide vaccine demonstrated that it reduced the numbers of first malarial fevers in children by around a third. Continuing studies with this and other vaccines are yielding additional data that will form the basis for recommendations for their use. In the meantime, emphasis is being placed on strengthening national capacity to diagnose and treat malaria; epidemic preparedness and control; and mobilizing sustainable international commitment for long-term malaria control.

In the countries of Africa south of the Sahara, special attention is being given to strengthening general health services and enabling health care providers from other sectors and the communities themselves to provide early diagnosis and prompt treatment, i.e. disease management. In the rest of the world, the emphasis is on improving the provision of basic curative services at all levels of health care and the promotion of rational drug use; and implementing selective measures for disease prevention, including selective vector control.

A ***dengue*** vaccine is being developed in Thailand with WHO's help. The results of clinical trials in adult volunteers show that it is safe, and its immunological response is encouraging. Trials of the vaccine in children have also begun.

A live, attenuated, highly efficacious vaccine for ***yellow fever*** is available and widely used, including in the Expanded Programme on Immunization in many countries. Protective antibodies appear 7-10 days after immunization and probably persist for life, although reimmunization is currently recommended every 10 years. Other interventions centre around prevention of bites from infected mosquitos. Thus mosquito control activities, especially targeted to *Ae. aegypti*, are critical in the prevention of urban transmission.

Urban transmission of yellow fever is essentially identical to that of dengue fever, a rapidly increasing public health problem in many countries of the tropics. Control of breeding of *Ae. aegypti* mosquitos around houses should lessen the risk of urban yellow fever transmission as well as that of dengue fever.

Vaccines are available for ***Japanese encephalitis***. They require an initial series of two injections, followed by a booster. Immunization is the most effective means of disease prevention. Efforts are under way to develop a live, attenuated vaccine that will be an improvement on the existing inactivated vaccine. Although promising results have been obtained, it will be several years before such a product is available for widespread use.

In ***filariasis*** four major breakthroughs have occurred, offering the prospect that – given sufficient political commitment and resources – the disease might eventually be well controlled or even eliminated.

The first of these breakthroughs is the development of safe, single-dose, annual drug treatments. Trials have proved that a single dose of diethylcarbamazine (DEC) is very effective even two years after treatment. A single dose of ivermectin has proved to be equally effective. A combination of single doses of both drugs reduced microfilaraemia more than 95% two years after treatment.

Secondly, intensive local hygiene on an affected limb, with or without the use of antibiotic and antifungal creams, has been shown to have dramatic effects by halting the progression of, or even reversing, elephantiasis and lymphoedema.

Thirdly, DEC-medicated table or cooking salt has been introduced in India. The carefully controlled addition of very low concentrations of DEC has long been recognized as an effective means of eliminating lymphatic filariasis infections in communities. However, the addition increases the price of the salt. During 1994, the first commercially prepared DEC salt went on sale in India, at about twice the price of ordinary salt. It remains to be seen whether the product will be a commercial success.

Finally, there has been the development of insecticide sprays and polystyrene beads to seal latrines and roof-top water-storage tanks, to eliminate or reduce populations of urban *Culex* mosquitos.

Leishmaniasis can be controlled through prompt diagnosis and treatment together with sandfly vector control. Relatively simple prevention methods are effective. They include vector control through insecticide spraying, personal protection with insect repellents, the use of insecticide-impregnated bednets or curtains, and the destruction of sandfly breeding sites. The tools to establish control exist, but there is a need for political commitment in order to apply them, and additional resources should be made available to all the countries in need.

Control measures extend to animals such as dogs and rodents that act as reservoirs for the parasite. Simple blood tests can identify infected dogs, which can be either treated or put down. Deep ploughing of rodents' burrows and the destruction of certain plants that the rodents eat can sharply reduce the rodent population and the incidence of the disease.

Sleeping sickness surveillance and control are hampered by a lack of skilled personnel at all levels, and the high costs of surveillance and tsetse control operations. Field research has shown the dramatic effectiveness of traps and screens to attract and destroy the tsetse flies. For the West African disease, there is a new and simpler field diagnostic test. A major breakthrough has been the development of a new drug – DFMO or eflornithine – the first against sleeping sickness in 40 years, so effective that it has been dubbed the "resurrection drug".

The ideal control strategy is to identify and treat all cases, and keep vector densities down with screens and traps. There should be mobile medical surveillance by specialized staff using the most effective diagnostic tools available. As the disease affects impoverished rural populations, additional support from the international community is required in order to implement these measures.

The control of ***onchocerciasis*** has for the last 20 years been the story of dramatic successes of the Onchocerciasis Control Programme which has eliminated the disease as a public health problem from 11 countries in West Africa through extensive insecticide spraying of the exposed vector breeding sites in the region, mostly from helicopters.

The recent availability of a safe, effective drug – ivermectin, capable of causing clinical improvement and decreasing the transmission of infection – has led to a new global strategy for controlling onchocerciasis in areas where vector control through spraying is not feasible, based on yearly administration of ivermectin to affected populations.

The anticipated duration for establishing sustainable programmes for the

Onchocerciasis has been eliminated as a public health problem from 11 countries in West Africa.

elimination of onchocerciasis as a public health problem is 10-15 years.

WHO has launched an ambitious new programme – the African Programme for Onchocerciasis Control (APOC) – in close cooperation with the World Bank, the governments of 16 participating countries where the disease exists but which were not covered by the earlier programme, and a consortium of bilateral donors and nongovernmental development organizations (NGDOs). This new programme (which became operational in January 1996) aims to control and eventually eliminate the disease as a public health hazard from the entire African continent by the year 2002. APOC will directly benefit more than 15 million people infected with onchocerciasis and nearly 100 million people estimated to be at risk in these 16 participating countries.

The African Programme for Onchocerciasis Control will directly benefit more than 15 million infected people and nearly 100 million others at risk.

The programme will include community-based annual administration of ivermectin (donated by Merck & Co., Inc.) and selective aerial spraying of insecticide, the cost of implementation being borne by the various partners.

A programme to eliminate onchocerciasis as a public health problem in the Americas is being coordinated by the Pan American Health Organization with the support of NGDOs and the Inter-American Development Bank.

In general, the control of bubonic ***plague*** involves breaking the rodent-flea-human transmission chain by the use of insecticides, flea and rodent control and sanitation. Control of pneumonic plague aims at interrupting the respiratory route of person-to-person transmission. Antibiotics are effective in treating the disease.

Flea control involves the use of insecticides blown into rat burrows or distributed around houses frequented by rats. Insecticides should be used before any rats are killed or a rodent control campaign is carried out, because otherwise fleas leave dead rats in search of another living host such as humans.

Plague vaccines exist but are not recommended for immediate protection in outbreaks. Vaccination is only recommended for high-risk groups such as health workers and laboratory personnel who are more intensely exposed to risk of contamination.

Because it is transmitted in the wild, plague cannot be eradicated in the foreseeable future. Surveillance at local, national and international levels is crucial in the prevention and control of the disease.

Chagas disease is essentially untreatable. The available control measures are twofold. One is to interrupt transmission by systematic attack on the vectors which infest poorly constructed houses, spraying effective insecticides with residual action or using insecticide paints or fumigant canisters, and by improving housing and health education as part of rural and periurban development initiatives. The other is to systematically screen blood donors from endemic countries for *T. cruzi*, and to strengthen health infrastructures for multiple blood screening (HIV, hepatitis B and *T.cruzi*). Many countries such as Argentina, Bolivia, Brazil and Colombia have also enacted laws on methods to screen for or treat infected blood in blood banks.

In 1991, Argentina, Bolivia, Brazil, Chile, Paraguay and Uruguay (which accounted for some 60% of the total cases on the continent) launched the Southern Cone Initiative aimed at eliminating the disease as a public health problem, through vector control and blood screening. An intergovernmental commission on Chagas disease, set up under this Initiative, concluded in March 1995 that impressive progress was being made towards elimination of *Triatoma infestans*, the main vector of *T. cruzi* and that elimination of Chagas disease as a public health problem in the Americas by the year 2000 was achievable.

Diseases from animals

People have always depended on animals as sources of food, transport, labour and companionship. But countless species of animals are also sources of viral, bacterial and parasitic diseases transmitted in many ways, including direct contact, consumption of food derived from them, or water contaminated by them.

Infectious diseases that are transmitted from animals to humans are called zoonoses. Worldwide, rabies and brucellosis are the most serious of these, involving both wild and domestic carnivores in rabies, and cattle, sheep and goats in brucellosis. Many species of rodents are reservoirs of diseases that may endanger human health. Monkeys may be involved in the transmission of agents that have only recently emerged. And there are diseases – such as Ebola haemorrhagic fever – whose animal host remains unknown.

Rabies is a viral disease transmitted by domestic and wild animals to other animals and to humans through close contact with their saliva (for example through bites, scratches or licks on broken skin). Once symptoms of the disease develop, rabies is fatal to animals as well as humans and there is no cure for it.

The most frequent way in which humans become infected with rabies is through the bite of infected dogs, cats or wild carnivorous species such as foxes, racoons, skunks, jackals, wolves, and vampire bats. Cattle, horses and deer can become infected with rabies, but rarely transmit the virus to other animals, although they may transmit the disease to humans.

In developed countries, rabies is now found mainly in wild animals, from which the disease can be spread to domestic animals and humans. By contrast, in Africa, Asia and Latin America, dogs continue to be the main hosts and are responsible for most of the rabies deaths that occur worldwide. Dog rabies still presents a deadly threat in at least 87 countries, with a total population at risk of 2.4 billion people.

Reliable data on rabies are scarce in many areas of the globe, making it difficult to assess its full impact on human and animal health. The number of deaths caused each year by rabies is estimated to be at least 40 000 worldwide, and may be as high as 70 000. An estimated 10 million receive treatment each year after being exposed to animals suspected of having rabies. Most cases occur in Asia.

Human ***brucellosis*** is a bacterial disease caught from farm animals such as cattle, sheep, goats and pigs. WHO regards it as one of the world's most widespread of all zoonoses. It is reported in at least 86 countries, and there has been a big increase in cases in Eastern Mediterranean countries in the last 10 years. Apart from its human burden, it has an important impact on the animal industry in many countries.

The bacteria are transmitted mainly through consumption of unpasteurized milk and cheese, and the disease also occurs in workers on farms or in slaughterhouses, and in veterinary surgeons, as a result of a cut or inhalation during close contact with animals. Symptoms include high fever, headache and depression, and other complications can occur in severe cases. Recovery from severe disease is usual but disability is often pronounced.

The disease is now rare in most European countries and in North America and Australasia. Twenty-five countries in the Middle East report the disease and six of them report a combined total of about 90 000 cases a year.

Preventing and controlling diseases from animals

The most effective prevention of ***rabies*** after animal bites is to wash and flush a wound or point of contact with soap and water, detergent or plain water, and then to apply ethanol or a tincture or a solution of iodine. Although there is no cure, there is a vaccine, which is effective if given before or shortly after exposure.

Post-exposure vaccination today often requires a daily intramuscular injection for 14 days followed by booster injections. Recent studies with human vaccines suggest that more people could be vaccinated at less cost. Research shows that the number of vaccinations and the amount of vaccine used each time can be reduced by employing intradermal injections. Health staff need to be well trained in this technique.

Anti-rabies campaigns involve the wide distribution of oral vaccines contained in specially prepared baits for tar-

Dog rabies still presents a deadly threat in at least 87 countries.

get animals. The baits may be scattered by helicopter or light aircraft, or distributed manually on the ground, in rural and periurban areas where infected animals are known to live.

More than 60 million such vaccine baits have been distributed in Canada and 15 countries in Europe since 1978, when the campaign first began in Switzerland. As a result, cases of animal rabies in Europe have dropped by 80% since 1990. Continuation of the campaigns should lead to the elimination of fox rabies in much of Europe within the next few years. Dramatic decreases in human cases of rabies have also been reported in recent years in China, Thailand and Sri Lanka as a result of improved post-exposure treatment programmes and vaccination of dogs.

In the United States in 1995, about 1 million baits were distributed in southern Texas in an attempt to stop the progression of the current coyote rabies outbreak there. Racoons have supplanted skunks as the major reservoir species of rabies in that country. Cases of the disease in racoons have risen sharply since the early 1990s. This is due to the spread of racoon rabies, apparently through the migration of animals from a south-eastern focus to the north-eastern United States, particularly New England. No racoon-associated human rabies cases have yet been reported, but the spread is expected to continue for years and vaccine baits are being used against racoon rabies.

WHO, FAO and the International Office of Epizootics have been working closely together for many years to promote applied research on vaccines and diagnosis and also anti-**brucellosis** campaigns. Control of animal brucellosis is based on comprehensive vaccination programmes that range from cattle to camels and include buffaloes, sheep and goats, thereby steadily reducing the number of human cases.

Disease surveillance, collaboration between health ministries and veterinary services, and education campaigns aimed at animal food producers and the general population are key elements of prevention and control.

Education campaigns aimed at animal food producers and the general population are key elements of prevention and control.

Infectious diseases and cancer

Recent studies undertaken by the International Agency for Research on Cancer (IARC) have shown that cancer is the second most common cause of death in many parts of the world. An estimated 6.6 million people died of cancer in 1995, and 10 million new cases were diagnosed. It is generally believed that environmental and lifestyle factors as well as common practices such as diagnostic radiographic procedures are largely responsible for this disease. In addition, the link between infectious diseases and cancer is becoming increasingly clear, opening up new possibilities for prevention. Viruses, bacteria and parasites may be the "secret agents" of cancer.

Up to 84% of cases of some cancers are attributable to viruses, parasites or bacteria (see *Table* on page 61). WHO estimates that over 1.5 million (15%) of the new cases occurring each year could be avoided by preventing the infectious disease associated with them. About 1.2 million (20%) cancer cases in developing countries and 363 000 (9%) in developed countries are attributable to infectious agents. The relative impact of infections on the overall cancer burden is more important in those populations where communicable diseases are the leading causes of morbidity.

Stomach cancer. About 550 000 new cases a year of stomach cancer are attributed to the bacterium *Helicobacter pylori*. This represents about 55% of new cases of this cancer worldwide. First isolated in 1982, this bacterium has been shown to cause duodenal ulcers and gastritis. It has now been established that the infection may eventually lead to the development of stomach cancer, although other factors must also be involved (*Map A*).

Cervical cancer. Sexually transmitted infection of the cervix with human papilloma viruses types 16 and 18 involves a very high risk of developing cervical cancer, of which there are 529 000 cases a year. The viruses are responsible for an estimated 436 000 or 83% of these cases; 65% of cervical cancer cases are due to this virus in industrialized countries, and 87% in developing countries. The infection is most prevalent in sexually active young adults and the risk of acquiring it increases with every new sexual partner, although only persistent infections lead to cancer. In addition to cancer of the cervix, these viruses cause 31 000 or 80% of vaginal cancer cases worldwide (*Map B*).

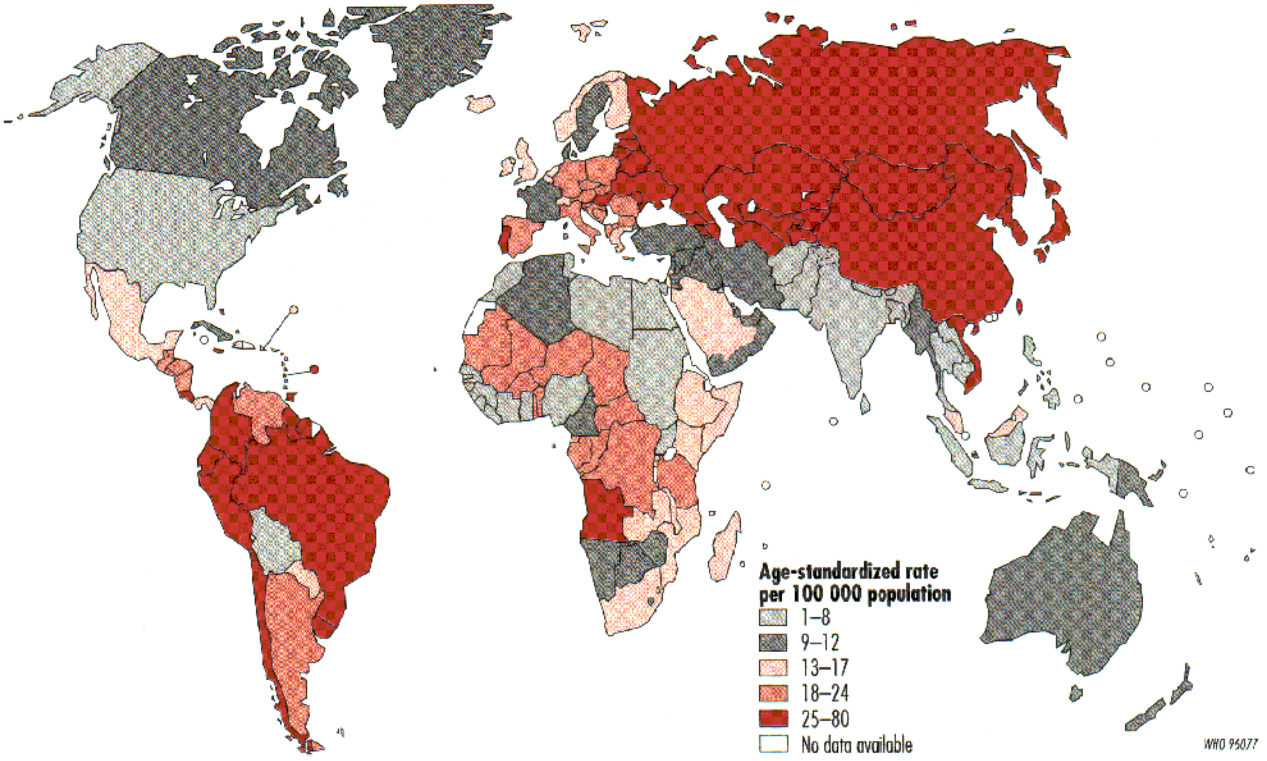
Liver cancer. WHO estimates that globally there are about 527 000 new cases a year of liver cancer, of which 82% are attributable to infection with the hepatitis B and C viruses. The viruses are transmitted in various ways, including sexually and through contaminated blood transfusions. Hepatitis B virus infection causes some 316 000 or 60% of liver cancers a year worldwide, while hepatitis C causes a further 118 000 or 22% of cases a year; some cases are the result of infections with both viruses (*Map C*).

AIDS-related cancers. The relative risk of Kaposi's sarcoma occurring in patients with HIV infection is so high that it was the first manifestation of the AIDS epidemic to be recognized. It causes distinctive skin tumours and also affects some internal organs. The proportion of patients with AIDS developing Kaposi's sarcoma is estimated at 15% for North America, Europe, Australia and New Zealand, 10% for Africa and 7.5% elsewhere. In all, about 33 400 cases of Kaposi's sarcoma developed among new cases of AIDS in 1995 worldwide. Non-Hodgkin's lymphoma, a cancer of the lymph nodes and spleen, is a relatively late complication of AIDS, occurring in about 6% of new AIDS cases in the developed countries and in about 1% in Africa. Globally the total number of AIDS-related non-Hodgkin's lymphoma is estimated at 8 600 or about 0.1% of all malignant neoplasms worldwide.

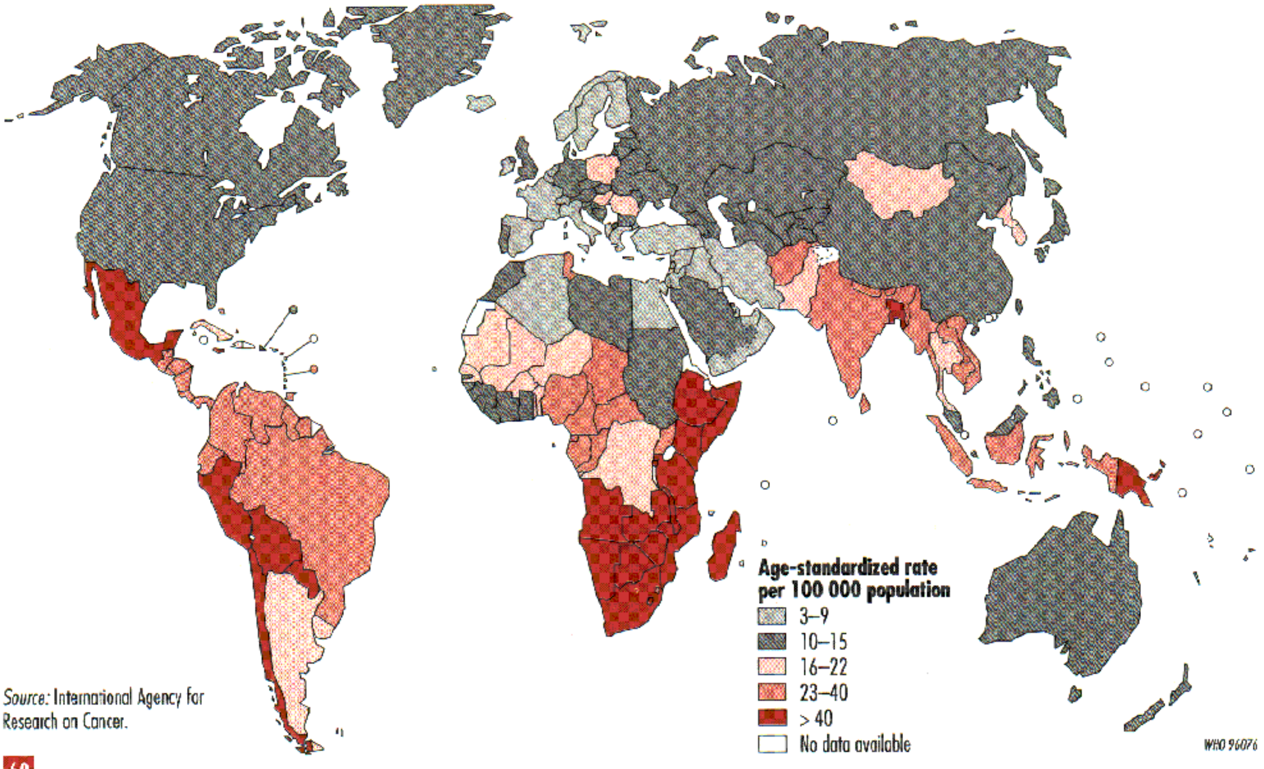
Burkitt's lymphoma. Predominantly a childhood disease, Burkitt's lymphoma is clearly and strongly linked with the Epstein-Barr virus in Africa. Virtually

Hepatitis B virus infection causes some 316 000 or 60% of liver cancers a year worldwide.

Map A. Stomach cancer, 1995
Estimated incidence in males



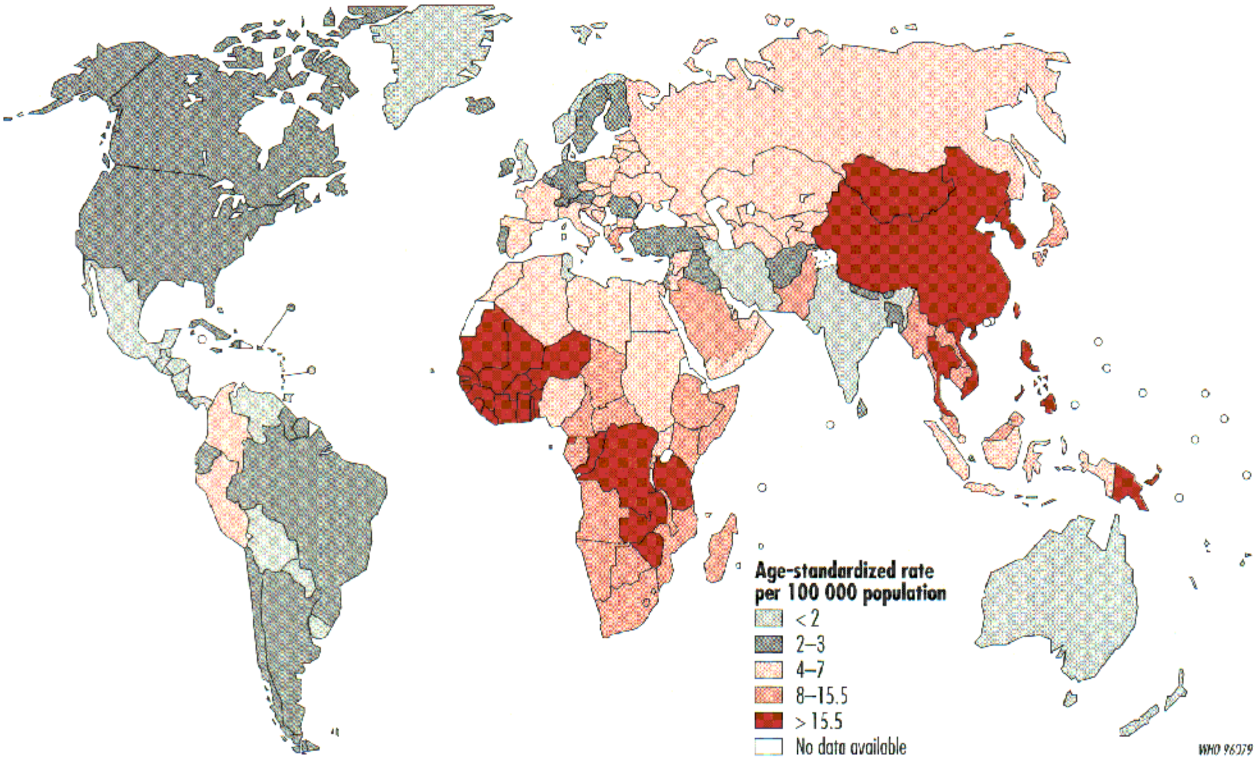
Map B. Cervical cancer, 1995
Estimated incidence



Source: International Agency for Research on Cancer.

Map C. Liver cancer, 1995

Estimated incidence



Percentage of new cancer cases attributable to infectious agents, 1995

Cancer site	Number of new cases (000)	Percentage attributable to infectious agent
All sites, *of which*	10 053	15
Stomach	996	55
Cervix uteri	529	83
Liver	527	82
Lymphomas, *of which*	303	16
Burkitt's	10	84
Non-Hodgkin's in AIDS	239	4
Hodgkin's disease	64	49
Bladder	304	4
Kaposi's sarcoma	. . .	. . .
Leukaemia	275	1
Other external female genitalia	39	80
Cholangiocarcinoma	. . .	. . .

Source: International Agency for Research on Cancer.

all cases in sub-Saharan Africa can be attributed to infection with the virus; the disease is much rarer in North America and Europe. The virus accounts for 8 670 or about 84% of the worldwide total of about 10 400 cases a year.

Hodgkin's disease. The pattern of age-specific incidence of Hodgkin's disease suggests that the disease has an infectious etiology in young adults – the result of delayed exposure to a common pathogen – analogous to the picture in poliomyelitis. Epstein-Barr virus was implicated in 30 900 (or about 49%) of 63 600 new cases of Hodgkin's disease worldwide in 1995.

Bladder cancer. About 12 600, or 4%, of the 304 000 new cases a year of bladder cancer are attributable to the parasitic disease schistosomiasis, which occurs exclusively in developing countries.

Viruses and other infectious conditions can cause cancer through a number of different mechanisms. Effective vaccines are only available against hepatitis B virus, and their use could cut the number of liver cancers by up to 70% in areas such as sub-Saharan Africa and eastern Asia, including China.

There are hopes that with the availability of vaccines in the near future, human papilloma viruses which cause cervical cancer, HIV which causes AIDS, and possible increases in the risk of certain other cancers, can also be effectively tackled.

For the present, however, healthy lifestyles, early diagnosis and appropriate treatment are still the most effective means of reducing incidence and mortality. The potential preventive interventions by immunization, other than for hepatitis B, are still a matter of experimental research for the other viruses.

Chapter 2

WHO's contributions to world health

The Global Strategy for Health for All by the Year 2000, founded on primary health care, provides the policy framework for worldwide health action.

This chapter gives an overview of WHO's contribution during the year 1995 to supporting the progress of Member States in the improvement of people's health. Each of the Organization's programmes consists of an aggregate of activities directed towards the attainment of specific objectives. Through close interaction amongst these programmes, the totality of their work is intended to contribute to global health improvement.

The activities of WHO's programmes are brought together in this chapter according to their effect on people's health at different stages of life – childhood, adolescence, adulthood and old age. In many cases, however, these effects cut across the age groups and concern the population as a whole. Because of the report's focus on infectious diseases, this chapter begins with highlights of WHO's activities in this particular field. It then moves to age-specific and other disease-specific programme activities and to those intended to induce positive changes in the determinants of health. It concludes with examples of WHO's work on health infrastructure, health policy and coordination.

The WHO Constitution (1946) sets the attainment by all peoples of the highest possible level of health as the ultimate objective of the Organization and its Member countries. With the decision of the Health Assembly (in 1977) to express this fundamental right of every human being to enjoy the highest standard of health as "Health for all", governments and WHO were committed to attaining, as a *minimum* by *all* people in *all* countries, *at least* such a level of health that they are capable of working productively and of participating actively in the social life of the community in which they live; this is popularly known as "health for all by the year 2000". In 1978 the declaration of the International Conference on Primary Health Care in Alma-Ata identified primary health care based on the principles of social justice and equity, self-reliance and community development in the promotion of health as the way to achieve this target of health for all by the year 2000. Subsequently, at a conference held in Riga in 1988, this primary health care strategy was reaffirmed as being valid beyond the year 2000.

The Global Strategy for Health for All by the Year 2000, founded on primary health care and adopted by the Health Assembly in 1981, provides both the policy framework for the worldwide health action needed to achieve the social target of at least a minimum level of health for all people and the framework for WHO's programme to support it. Three general programmes of work were envisaged to outline in greater detail, for the years 1984-1989, 1990-1995 and 1996-2001, both the global policy framework and the work of the WHO secretariat up to the year 2000. This chapter reviews WHO's contributions to global health during 1995, the final year of the eighth General Programme of Work covering the period 1990-1995.

Various programmes and their activities developed by the Organization within this eighth General Programme of Work correspond to the major functions of the Organization as defined by Article 2 of the WHO Constitution, namely to act as the directing and coordinating authority on international health work and to provide technical cooperation for health within Member States. All WHO's programmes and activities are guided by the principles of

WHO can now mobilize staff and place teams on site within 24 hours of notification of an outbreak.

the Declaration of Alma-Ata and the Global Strategy for Health for All by the Year 2000. The primary focus for the Organization's work was to continue to be the enhancement of countries' capacity to define and implement their own priorities for health development and public health action, disease prevention and health promotion and to establish sustainable health infrastructures. To this end, four broad interlinked categories of programmes for the period 1990-1995 were identified:

- *direction, coordination and management*, concerned primarily with formulation of the policy of WHO and its promotion among Member States and in international political, social and economic forums;
- *health systems infrastructure*, aimed at establishing comprehensive health systems based on primary health care;
- *health science and technology* as an application of methods and techniques, constituting the content of the health system;
- *programme support*, dealing with information, financial, and administrative support.

In implementing its work, WHO was to be guided by four policy orientations: (1) integrating health and human development in public policies; (2) ensuring equitable access to health services; (3) promoting and protecting health; and (4) preventing and controlling specific health problems.

The entire extent of WHO's work cannot be fully reflected in this chapter, but the examples given illustrate the many ways in which WHO shares in and guides health development, both in its technical work and in setting global policy and standards. Regional highlights are also presented. This evaluation of what the Organization has done, and the impact of that work on global health, then provides the framework for Chapter 3, which outlines the Organization's priority issues and its strategy for tackling them in 1996.

Emerging issues in infectious disease control

While focusing on the eradication, elimination and/or control of major diseases of global concern, WHO's recently strengthened capacity to combat ***new and re-emerging infectious diseases*** will bolster national and international collaboration for their surveillance and control. WHO can now mobilize staff and place teams on site within 24 hours of notification of an outbreak, together with the supplies and equipment required to implement epidemic control measures. It will also mobilize and coordinate the activities of an international network of collaborating centres, bilateral donors, expert advisers and nongovernmental organizations as required.

In the 1995 outbreak of Ebola haemorrhagic fever in Zaire, for example, WHO staff arrived at the site of the epidemic within 24 hours of notification being received in Geneva, and at the same time that the diagnosis of Ebola fever was confirmed at the WHO collaborating centre on viral haemorrhagic fevers at the United States Centers for Disease Control and Prevention in Atlanta (see *Box 4*, page 16).

To prepare for such emergencies WHO uses innovative field epidemiology and public health laboratory training programmes to strengthen country surveillance and disease control, so that countries can develop the early warning systems necessary to detect emerging or re-emerging diseases. The Organization is developing a network of public health laboratories to strengthen regional and international collaboration in the detection and control of outbreaks. The Kenyan Medical Research Institute in Nairobi and the National Institute of Communicable Diseases in New Delhi, for example, are fully ready to serve as regional centres of expertise.

As part of its work in detecting and monitoring ***antimicrobial resistance*** worldwide, WHO has developed an information system to support the global surveillance of bacterial resistance to antimicrobial agents (WHONET). As of the end of 1995, a total of 177 laboratories in 31 countries or areas were participating. Also, in order to tackle the emergence of strains of M. *tuberculosis* resistant to antimycobacterial agents, WHO together with the International Union against Tuberculosis and Lung Disease has set up the global project of Antituberculosis Drug Resistance Surveillance (*Box* 5, page 21).

Infectious diseases, all ages, according to mode of transmission

This section illustrates how WHO is working to improve the situation with respect to selected infectious diseases as described in Chapter 1. It mainly reflects activities of global significance, but many of WHO's activities take place within each region. A summary of these can be found on pages 92–103.

Areas that are particularly relevant to children (acute lower respiratory infections, measles, pertussis, meningococcal meningitis, poliomyelitis, tetanus) are discussed in the section on child health, below.

Infectious diseases transmitted from person to person

The epidemic of ***diphtheria*** originating in Europe in 1992 has now spread to the Western Pacific. When an outbreak of diphtheria occurred in Mongolia in late 1994, WHO launched a rapid and effective response with the support of Japan. Once all those under 15 had been immunized, national immunization days for diphtheria control took place in late 1995, targeting the vulnerable population aged between 16 and 40 years.

Tuberculosis control programmes are already overwhelmed by the growing prevalence of HIV infection. In response to this situation and to prevent the collapse of tuberculosis programmes in countries with a newly emergent HIV problem, WHO is mobilizing experts from both industrialized and low-income countries to develop a new research strategy.

WHO promotes the "directly observed treatment, short-course" (DOTS) strategy, already mentioned in Chapter 1, as the key to halting the current epidemic. Comprehensive technical advice on implementing the strategy is given in guidelines issued by WHO for national programmes. Training materials produced during 1995 included a package on managing tuberculosis at district level, four new modules for training national programme managers, guidelines on drug supply, and a handbook on case detection and treatment. During 1994-1995 WHO-supported workshops in 15 countries trained over 400 professionals in all regions.

WHO coordinates activities of the different parties involved in the development of improved immunization technology and easier vaccine delivery. Seed money spent under WHO auspices on tuberculosis vaccine development (totalling $6 million) stimulated other agencies and industry to donate about ten times this amount, and a whole range of different candidate vaccines are now becoming available.

A whole range of different candidate vaccines against tuberculosis are now becoming available.

Steady progress is being made towards the goal of eliminating ***leprosy*** as a public health problem (that is, achieving a prevalence of less than 1 case per 10 000 population) before the end of the century. In 1981 WHO recommended a "cocktail" of three drugs which effectively prevent the leprosy bacillus from becoming resistant to any one of the three. This multidrug therapy now seems certain to stop the disease in its tracks. It is effective, relatively cheap and acceptable to all patients and at the end of the treatment period the cure is complete.

The strategy at this stage of near-elimination is to concentrate on reaching patients in areas difficult of access and to promote community awareness and use case-finding strategies to detect everyone who remains untreated.

The genetic map of *Mycobacterium leprae* – the organism causing leprosy – is the most advanced one in WHO's parasite genome project. This project aims to achieve a better understanding of the biology of organisms causing tropical diseases, with a view to developing new prevention and control strategies.

In February 1995 WHO announced the composition of the ***influenza*** vaccine for the 1995–1996 season, replacing two of the three components that had been included in the vaccine for the previous season.

The importance of the ***HIV/AIDS*** pandemic cannot be measured solely by the number of infected or sick individuals. In keeping with the United Nations International Year of Tolerance, the slogan for World AIDS Day 1995 was "Shared rights, shared responsibilities". WHO urged individuals, families, governments and the international community to ensure that AIDS-related rights are respected and AIDS-related responsibilities are fulfilled. WHO was involved in the setting up of a Joint United Nations Programme on HIV/AIDS (UNAIDS), which became operational on 1 January 1996.

> *WHO urges individuals, families, governments and the international community to ensure that AIDS-related rights are respected and AIDS-related responsibilities are fulfilled.*

Involvement of the private sector in HIV/AIDS activities was promoted through a joint WHO/ILO international seminar, bringing together representatives of government, industry and trade unions from over 20 countries. Training in condom promotion continued in most regions. A WHO study demonstrated the efficacy of the female condom as a protection against sexually transmitted diseases.

Studies were supported in the areas of household and community responses to HIV/AIDS; risk-taking among young people in developing countries; sexual negotiation, empowerment of women and the female condom; and the determinants of HIV/AIDS-related discrimination, stigmatization and denial.

A four-centre study was initiated on the efficacy of the antiretrovirals zidovudine (AZT) and lamivudine (3TC) in preventing mother-to-child transmission of HIV. Studies on the treatment and prophylaxis of a number of opportunistic infections were also supported. Diagnostic algorithms for detection of HIV-1 group O viruses were evaluated through surveillance studies in central and West Africa. An efficacy study of a long-acting vaginal microbicide, COL-1492, was begun in Côte d'Ivoire and Thailand.

Vaccine development focused on the preparation of field-testing sites in developing countries and support to the WHO network for HIV isolation and characterization. A phase II immunogenicity trial was begun with support from Thailand.

Foodborne, waterborne and soilborne diseases

WHO has concluded an agreement with Swiss Disaster Relief to provide technical assistance in epidemic ***diarrhoea*** control and preparedness. Links have also been established with UNHCR, the Istituto Italo-Latinoamericano in Rome, EPICENTRE Groupe européen d'Expertise en Epidémiologie pratique in Paris, the United States Centers for Disease Control and Prevention in Atlanta, USAID and the National School of Public Health in Spain. The work also receives financial support from the Governments of Australia, Italy and Switzerland. Special collaboration has begun with the International Federation of Red Cross and Red Crescent Societies in the newly independent States of eastern Europe and central Asia (see also the section on child health, below).

Under the southern African initiative for control of epidemic diarrhoea, a team in Harare continued to coordinate activities aimed at improved preparedness and response to ***cholera*** and ***epidemic dysentery***. Support was also given to five African countries in policy formulation, in developing a rapid surveillance system and in strengthening bacteriological laboratory services. Diarrhoea training units were established in Malawi and Mozambique. An intercountry workshop on cholera was held in Maputo for participants from Portuguese-speaking African countries. An intercountry briefing meeting on dysentery was held in English and French in Harare.

Surveillance and control strategies for cholera and dysentery were set up in refugee camps in the United Republic of Tanzania and in Zaire. Contingency plans were updated, clinical training courses organized and emergency supplies provided. Several West African countries reported outbreaks of cholera or dysentery caused by *Shigella dysenteriae* serotype 1. Technical assistance and emergency supplies were provided to six African countries. Intercountry workshops on cholera preparedness and control were organized in Ghana for English-speaking and in Guinea for French-speaking African countries. A coordination meeting on cholera emergency preparedness and control was organized in Egypt for Djibouti, Eritrea, Ethiopia, Kenya, Somalia and Sudan.

Particular efforts were made in the development of vaccines against cholera and dysentery but WHO does not recommend any vaccine so far available for use in the prevention and control of cholera during acute emergencies.

WHO reassessed the distribution and prevalence of ***schistosomiasis*** in the world and its social and economic impact. The Organization supports training, for example in Botswana and Senegal, with IDRC support. A project was initiated in the Lao People's Democratic Republic to train provincial staff in schistosomiasis control methods. Trials of the combination of two drugs, albendazole against common intestinal helminths and praziquantel against schistosomiasis, demonstrated it to be safe and effective.

Dracunculiasis (guinea-worm disease) is on the verge of eradication. In 1986, the World Health Assembly set the goal of elimination; in 1989 it called for a strengthening of efforts; in 1991, it declared its commitment to the goal of eradicating dracunculiasis by the end of 1995, this being technically feasible given appropriate political, social and economic support.

WHO's priorities are to achieve the interruption of transmission as quickly as technically feasible and to facilitate the work of the independent International Commission for the Certification of Dracunculiasis Eradication (created in 1995) by conducting the global certification process. The main objectives are to facilitate the search for remaining, unknown foci of dracunculiasis in countries considered to be at high risk but not known to be endemic; to verify whether low-risk countries are free of dracunculiasis and prepare for their certification as "dracunculiasis-free"; to prepare for a smooth transition to the certification phase, as currently endemic countries become free of dracunculiasis; and to secure funding for complete dracunculiasis eradication and the certification process, approximately $10 million in all (which should be completed three years after the last case of guinea-worm disease is reported anywhere in the world).

Guinea-worm endemic villages are often the most remote in Africa, and until recently many did not appear on available maps. They were therefore underserved by the public health system. To facilitate effective targeting of interventions for the eradication of the disease, UNICEF field-based staff undertook to map the location of all endemic villages. WHO staff were able to provide information regarding health facilities and epidemiological data and through this initiative, the WHO/UNICEF Joint Programme on Data Management and Mapping for Public Health was established in 1993. Using a geographical information system, data on guinea-worm disease are presented in the form of maps showing distribution in relation to water sources, health centres and schools. This information enables district-level coordinators and national decision-makers to effectively target activities, to monitor the situation and plan future operations. The system is now being established at national, regional and global levels for monitoring results of epidemiological surveillance for dracunculiasis and other diseases in the villages concerned.

In recent years ***food safety*** assurance has become increasingly important. To help public health officials deal with problems associated with several newly emerging foodborne pathogens, such as trematodes – which are acquired through the consumption of raw or inadequately processed freshwater fish,

Particular efforts are being made in the development of vaccines against cholera and dysentery.

Box 12. The new trade environment - can health and commerce be complementary?

The new trade agreements issuing from the Uruguay Round of multilateral negotiations are intended to further liberalize international trade and provide greater access of all parties to markets. Although these objectives may seem removed from WHO's concerns, the Organization strives to ensure that health is protected in several of the areas covered by the agreements. In turn, some of its products contribute to facilitating international trade.

For instance, WHO's quality standards for pharmaceutical, biological and food products are the kind of internationally agreed standard that the Agreement on Technical Barriers to Trade encourages governments to adopt as a basis for national regulations. Intended to protect health, they are also of use for trade purposes. The South American countries belonging to the Mercosur common market, for example, adopted WHO's requirements for good manufacturing practices for pharmaceutical products in order to harmonize regulations within their trade group, and a number of OECD countries decided to eliminate customs duties on pharmaceutical active ingredients bearing a WHO international nonproprietary (generic) name. The recommendations and guidelines established by the Joint FAO/WHO Codex Alimentarius Commission are specifically cited in the Agreement on the Application of Sanitary and Phytosanitary Measures as the reference for national food safety regulations. With world food trade amounting to some $250 billion a year, there are strong economic reasons for countries to ensure that their food exports meet these norms.

WHO also guides health authorities on ways to tackle new situations produced by the agreements. For countries that decide to open their health sectors to foreign service suppliers under the General Agreement on Trade in Services, WHO offers information and advice on such aspects as the appropriate mix of public and private involvement. By maintaining and promoting the Model List of essential drugs – comprising off-patent pharmaceuticals and vaccines – it furnishes an increasingly valuable tool for developing countries in view of the Agreement on Trade-Related Aspects of Intellectual Property, which extends, for the first time, patent protection to pharmaceuticals.

Along with its efforts to improve health conditions of workers, including those in major exporting sectors in developing countries such as agriculture, mining or manufacturing, and its special attention to protection of environmental health, WHO provides support to meet the challenges – and to take advantage of the opportunities – of an environment of expanding trade.

shellfish and aquatic plants – WHO has published a report on recommended control measures. As a part of its efforts to prevent foodborne disease, WHO is studying the microbiological contamination of foods and patterns of human behaviour which may lead to the growth or survival of *Vibrio cholerae* and other foodborne pathogens.

The Joint FAO/WHO Codex Alimentarius Commission ensures that internationally agreed food standards, guidelines and other recommendations are consistent with health protection. With the creation of the World Trade Organization (see *Box 12*) and the entry into force of the Agreement on the Application of Sanitary and Phytosanitary Measures concerning the application of food safety, and animal and plant health regulations, the Codex now serves as the international reference for national requirements. To strengthen the scientific basis of Codex decision-making, WHO and FAO convened expert consultations on the use of risk analysis in establishing food standards and on guidelines for predicting dietary intake of pesticide residues.

Insect-borne diseases

Of the total number of ***malaria*** cases and deaths worldwide, 90% occur in Africa, principally among children, so that 1 million or so of them die each year from the disease alone.

Standard methods for assessing the therapeutic efficacy of antimalarial drugs are being simplified. An interregional system is being established for monitoring drug resistance in South-East Asia and the Western Pacific. WHO supports operational research, for instance, on strategies to improve compliance with multidose antimalarial drug regimens and the use of artemisinin derivatives in South-East Asia and the countries of Indochina.

Other research is aimed at improving disease management, including simple and rapid diagnostic techniques. A dipstick (antigen capture) assay for detection of *Plasmodium falciparum* was evaluated in field trials and compared favourably with microscopy.

Some 150 senior programme managers and specialists, many from sub-Saharan Africa, attended international courses on malaria control, and 1 300 staff from 21 endemic countries were trained in disease management. More than 200 district medical officers were trained in the management of severe malaria in eight African countries and Bangladesh.

Material on basic statistics and epidemiology was produced for use in a three-month training course in Ethiopia, due to start in 1996 with financial support from the Netherlands. Courses were held for 48 health centre and vector control staff from epidemic-prone areas of Turkey, with support from the European Commission. Similar training took place in India and Nepal with funding from the Overseas Development Administration of the United Kingdom (ODA). By March 1996 some 1 160 persons will have been trained.

Training of community health workers in the diagnosis and treatment of malaria commenced with support from Italy in Eritrea and Ethiopia and support from the Netherlands and ODA in Ghana, Uganda and Zambia. Training of pharmacists and other vendors in the correct use of antimalarial drugs started in three African countries with support from ODA.

WHO assisted in control measures in refugee camps in Burundi, Rwanda, United Republic of Tanzania and Zaire and mobilized funds to combat epidemics in the north of the Islamic Republic of Iran. Training was provided on disease management and selective vector control in Turkey.

WHO-led research enabled a technical breakthrough whereby scientists can add, delete and change the genes of *Plasmodium falciparum*, the deadliest of the parasites causing malaria, thereby opening up a vast array of potential new techniques for diagnosis, and drug and vaccine development. By the end of 1995, the potent antimalarial artemether – based on the Chinese herb extract qing haosu – had been registered in several countries for the treatment of severe malaria.

The "altruistic" transmission-blocking Pfs25 vaccine (so called because it is designed to prevent malaria spread to others, not to prevent malaria in the recipient of the vaccine) entered Phase I clinical trials, and work on some 15-20 other promising vaccine candidates was further advanced. Trials on the most promising candidates are due to be completed by 2002.

The rapid spread of ***dengue fever*** and ***dengue haemorrhagic fever*** is causing great concern to public health specialists and WHO. Until 1970, only nine countries had faced epidemics of dengue haemorrhagic fever; now at least 38 countries have experienced them.

There is no specific treatment and effective vaccines will not be available for some years. Currently, the only effective way to prevent the disease is to eliminate the mosquito vectors or drastically reduce their numbers.

The WHO global control programme recommends the following broad guidelines for dengue-endemic countries: selective, integrated vector control, with community and intersectoral participation; active surveillance based on a strong health information system; emergency preparedness; capacity-building and training; and research on vector control.

Dengue fever and dengue haemorrhagic fever are notifiable in Indonesia, Myanmar and Thailand, where national control programmes have been developed with WHO support. India also has a national prevention and control strategy.

WHO participated in the implementation of the vaccination campaign that controlled the epidemic of jungle ***yellow fever*** in Peru in 1995, the largest outbreak recorded since 1950.

The human immunization strategy to control ***Japanese encephalitis*** was used in endemic areas in India, Sri Lanka and Thailand, with WHO providing technical support and diagnostic reagents and assisting countries in the procurement of vaccines. During 1993-1995 a declining trend in morbidity and mortality in Sri Lanka and Thailand was seen as a result of vaccination and vector control activities.

With the recognition of ***lymphatic filariasis*** (elephantiasis) as the second leading cause of permanent, long-term disability and as one of only six potentially eradicable infectious diseases, efforts are being made to apply new control tools and elimination strategies. Multicentre trials of single-dose diethylcarbamazine, single-dose ivermectin and combinations of both drugs show that all these regimens are effective and safe, with the two-drug combination producing the best results. Diethylcarbamazine proved effective for filariasis control in China.

A vast array of potential new techniques for malaria diagnosis and drug and vaccine development is opening up.

In view of the sharp increase in co-infections of AIDS with visceral ***leishmaniasis*** (kala-azar) in certain parts of the world such as southern Europe, and of the special difficulties of diagnosis and treatment encountered, WHO has recently set up a surveillance network of 14 institutions worldwide, endorsed guidelines for diagnosis and established a central registry to collect, analyse and periodically rediffuse updated epidemiological information.

Prompt action was taken to curb the spread and limit mortality from the severe epidemics of visceral leishmaniasis that have raged in southern Sudan during the last five years. The high mortality rate fell dramatically following the introduction of a decentralized serodiagnosis and treatment system. Drugs and supplies were procured and technical assistance provided with support from UNICEF and Médecins sans Frontières (Netherlands). Periodic technical input was provided to Bangladesh for step-by-step implementation of an emergency plan of action to control the disease in the five endemic districts most affected by it.

Some 1.5 million people who were once infected no longer have any trace of onchocerciasis.

The use of insecticide-impregnated bednets is being investigated as an alternative to vector control in foci of cutaneous leishmaniasis (Islamic Republic of Iran, Syrian Arab Republic) and visceral leishmaniasis (Bangladesh, Nepal, Sudan). Preliminary results are highly promising. WHO is also testing the use of long-lasting insecticidal paints to control sandflies in the home in India and north-eastern Brazil.

Research in Tunisia has demonstrated that deep ploughing of burrows of the rodent vector *Psammomys obesus* and destruction of the plants which are its obligatory food can sharply reduce the incidence of the disease. Phase III large-scale protection trials began in the Islamic Republic of Iran of a vaccine based on killed *Leishmania major*. A workshop cosponsored by WHO, ODA and the London School of Hygiene and Tropical Medicine led to the preparation of a technical manual on control of visceral leishmaniasis, to be distributed in 1996.

Guidelines for control of African ***trypanosomiasis*** (sleeping sickness) were prepared for Angola and Zaire, and plans of action developed for several countries. A revolving fund was established to ensure the supply of drugs to national programmes. Studies on the pharmacokinetics of two classical drugs against trypanosomiasis, pentamidine and melarsoprol, suggest that shorter treatment schedules and lower dosages may be just as effective as those currently used. Clinical trials are planned to investigate these results.

Onchocerciasis is the world's second leading infectious cause of blindness. The WHO, World Bank, UNDP and FAO joint Onchocerciasis Control Programme was launched in 1974. Today some 1.5 million people who were once infected no longer have any trace of the disease. About 10 million children born in the operational area since the programme began are now free of any risk of contracting the disease. To complement vector control activities, the drug ivermectin is distributed free of charge to more than 2.2 million people in the operational area.

The control activities are opening up an estimated 25 million hectares of fertile riverine land for resettlement and cultivation with an additional 17 million people annually.

The Programme is now nearing the end of its fourth 6-year funding cycle and is scheduled to come to an end by the year 2002. It will have cost an estimated total of $550 million, or less than $1 per year for each protected person.

The new African Programme for Onchocerciasis Control will continue to draw on the support of several United Nations agencies together with the World Bank; in addition, it will collaborate closely with the international nongovernmental development organizations coordination group for ivermectin distribution, which has produced a procedural manual jointly with WHO. The recently established partnership committee of NGOs and WHO also fosters active collaboration in the prevention of blindness and in rehabilitation.

The campaign to eliminate ***Chagas disease*** from the Southern Cone of the Americas (Argentina, Brazil, Bolivia, Chile, Paraguay, Uruguay) is making good progress. Reports indicate decreases in house infestation rates of 75% in 13 out of 15 endemic provinces in Argentina, 89% of municipalities affected in Brazil, 90% throughout Chile, and 98% in all endemic areas of Uruguay. A total of $158 million has been allocated for control measures by the six countries since 1992.

Activities directed to specific age groups

Child health

Since 1960, child and infant mortality have been greatly reduced, from more than 180 and about 130 per 1 000 live births respectively in 1960 to about 80 and 60 respectively in 1995. ***Immunization*** against six vaccine-preventable diseases – diphtheria, pertussis, tetanus, measles, tuberculosis and poliomyelitis – has saved millions of children annually from death and disability. WHO and UNICEF, working jointly, have harnessed the commitment of individual countries and the international community to fight diseases and foster development.

WHO/UNICEF strategies for attaining the health-related goals of the 1990 World Summit for Children, including high-impact interventions, are aimed at eradication of poliomyelitis, dracunculiasis and iron deficiency disorders; elimination of measles, neonatal tetanus and vitamin A deficiency and its consequences, including blindness; control of diarrhoeal diseases and acute respiratory infections; and reduction in the prevalence of underweight children.

By 1995, the goal of 80% immunization coverage had been achieved for all childhood vaccines (except tetanus toxoid) globally; 73 developing countries are now reporting above 80% coverage but there are still 25 countries – 19 of them in Africa – reporting coverage below 50% for all six vaccines in 1994. Comprehensive plans of action have been developed in six African

Box 13. Progress towards polio eradication

Since WHO resolved in 1988 to eradicate poliomyelitis from the world, cases have fallen by about 85%. Eradication means completely freeing all countries of naturally occurring polioviruses – a step further than elimination, which means getting rid of the clinical disease.

The first polio vaccine, administered by injection, was developed in 1955 by Dr Jonas Salk. The second, administered orally, was developed by Dr Albert Sabin, and introduced in 1961. Worldwide, about 5 800 cases were reported for 1995. There are now 145 countries completely free of the disease, and an estimated 82% of all eligible children in the world have received the recommended three doses of oral polio vaccine. Almost half the world's children under 5 years of age – about 300 million of them – received the vaccine in national immunization days in 1995.

All countries of the western hemisphere have been polio-free since 1994. The disease is disappearing from Europe, North Africa, Southern and East Africa, the Middle East and the Arabian Peninsula, and the Western Pacific. Progress reports from all WHO regions are given below.

Africa. Thirteen countries immunize under 50% of infants against polio, but 27 countries will have conducted full national immunization days by early 1997. WHO has launched a "Kick polio out of Africa" campaign with the support of prominent political figures.

The Americas. Polio has been eradicated for over four years. The last case was in Peru in 1991.

Eastern Mediterranean. Just over 700 cases were reported for 1995. On World Health Day in April, nearly 63 million children in 18 contiguous countries in the Middle East, the Caucasus and the central Asian Republics were immunized in an operation called MECACAR. The operation was jointly planned with the European region.

Europe. An outbreak of 140 cases occurred in the Russian Federation in 1995. Otherwise polio cases have remained static in Europe since 1988, with barely 200 cases reported for 1995. The Russian Federation is scheduled to take part in a second MECACAR operation in the spring of 1996.

South-East Asia. Reported cases have fallen more than eight-fold since 1988 to under 3 300 in 1995. India immunized 82 million children on 9 December 1995; five other countries conducted their first national immunization days.

Western Pacific. Just over 200 cases were reported in 1995. Cambodia conducted its first national immunization day in 1995, reaching 99% of children.

Globally, 67 countries remain endemic for poliomyelitis, including those with the greatest difficulties in achieving satisfactory immunization coverage because of remote populations, wars, civil unrest or economic chaos. About 90 000 cases a year are estimated still to occur worldwide, three-quarters of them in the Indian subcontinent.

Polio-endemic countries meet 80% of the costs of eradication themselves, but the remaining 20% – equal to $100 million a year until the year 2000 – depends on external donors. As many as 10 billion doses will be needed to ensure eradication.

Maintaining the political will and global partnerships that are essential if eradication is to be achieved is a priority for the coalition of WHO, UNICEF, Rotary International and other agencies and organizations committed to the campaign.

Apart from lives saved and disabilities prevented by eradication, the global financial savings are expected to total at least $1.5 billion a year.

countries, but major efforts are urgently needed to cover all the other low-performance countries.

Since the global ***polio*** eradication goal was established in 1988, reported cases of the disease have declined by about 85% (*Box 13*).

For the fourth consecutive year, global ***measles*** immunization coverage remained at about 80% in 1994, ranging from 54% in Africa to 88% in the Western Pacific. Since immunization began, the numbers of measles cases and deaths have dropped by about 70% and 83% respectively. However, about 1 million deaths and 43 million cases still occur annually.

> *Child health programmes therefore need to address the sick child as a whole rather than single diseases.*

Measles is targeted for elimination in the Americas by the year 2000 and "catch-up" immunization campaigns for all children aged 9 months to 14 years have been organized in all Latin American and English-speaking Caribbean countries. In other regions, many countries are pursuing innovative immunization strategies. Some, particularly in the Western Pacific, have included the administration of measles vaccine in the activities of their national immunization days.

Substantial progress has been made globally in the elimination of ***neonatal tetanus***, particularly in the Americas and in South-East Asia. More than 700 000 neonatal deaths are now being prevented annually through routine immunization of women with tetanus toxoid, particularly in high-risk areas, and through improved hygienic birth practices. The number of countries with less than one neonatal tetanus death per 1 000 live births increased from 76 in 1980 to 122 in 1995. Effective surveillance has been promoted.

The World Health Assembly decided in 1990 on the elimination of ***iodine deficiency disorders*** by the year 2000. In 1993 the World Health Assembly reaffirmed this goal and provided strategic guidance, including emphasis on salt iodization. WHO, in close collaboration with UNICEF and the International Council for the Control of Iodine Deficiency Disorders, has been providing technical guidance and programme support to Member States and the international community.

There is encouraging evidence that the prevalence of goitre and the incidence of cretinism, both major iodine deficiency disorders, are falling, particularly in areas where iodized salt programmes are established. Of 118 countries where iodine deficiency disorders are a significant public health problem, 83 had national salt-iodization programmes in 1995. In over 30 African countries the population consuming iodized salt has increased from less than 5% in 1992 to more than 50% in 1995; the proportion of salt that is iodized is over 70% in Latin America and about 50% in South-East Asia.

Every year mor than 8 million children are killed by diarrhoea, pneumonia, measles, malaria or malnutrition – or often by some combination of them. Three of every four children brought for health care suffer from at least one of these conditions. Child health programmes therefore need to address the sick child as a whole rather than single diseases. To this end, WHO and UNICEF have jointly developed an approach for the ***integrated management of the sick child***, which gives due attention to both prevention and treatment of childhood disease (*Box 14*).

The WHO/UNICEF course *Management of childhood illness* enables health workers in outpatient clinics and health centres to manage infant and early childhood illnesses effectively in an integrated fashion. The course is based on treatment guidelines developed by WHO and covering the most common potentially fatal conditions. WHO teaching materials on diarrhoeal disease are now being used in 147 medical schools in 35 countries. As regards acute respiratory infections, the focus is on 88 countries where the 1990 infant mortality rate was 40 or more per 1 000 live births, and where a case management strategy can have the greatest impact in reducing mortality.

It is essential to teach families to respond rapidly to signs of illness. A major emphasis in national programmes is on communication between health workers and families. In 1995, radio broadcasts for disseminating messages among families were developed for Bangladesh and the United Republic of Tanzania.

A course on breast-feeding counselling, jointly developed by WHO and UNICEF, was given to referral-level health workers in seven countries. The Subcommittee on Nutrition of the United Nations Administrative Committee on Coordination estimated that the prevalence of ***underweight children*** aged less than 5 years had fallen from 34% in 1985 to 31% in 1995 for the developing countries as a whole. About 4 out of 10 children aged under 5 in the least developed countries were underweight in 1995, compared with about 3 out of 10 in other developing countries; in South Asia however one in two children were classified as underweight. In sub-Saharan Africa there were estimated to be about 6.7 million more underweight children in 1995 than in 1990. Food availability in the area is not expected to increase significantly in the next 25 years.

WHO provides normative information on monitoring, prevention and management of major crippling forms of ***malnutrition***, with emphasis on protein-energy malnutrition, micronutrient malnutrition such as iodine deficiency disorders, vitamin A deficiency, and nutritional anaemia. The Organization also gives support to countries in dealing with infant and young child nutrition in emergency situations.

Research is essential to reducing mortality and morbidity in children. WHO-supported research found that zinc supplementation in young children with diarrhoea produces clinically important reductions in both the duration and the severity of diarrhoea. A multicentre study on the efficacy and safety of linking vitamin A supplementation to immunization began in three countries. WHO is supporting field trials to evaluate the efficacy against acute diarrhoea of a rotavirus vaccine in Venezuela, and the efficacy of a *Haemophilus influenzae* type b conjugate vaccine for preventing pneumonia and meningitis in the Gambia.

Box 14. Integrated management of childhood illnesses

Over 70% of deaths among children under age 5 are due to diarrhoea, pneumonia, measles, malaria or malnutrition, alone or in combination. Three in every four children brought for care to health facilities suffer from one or more of these conditions.

A single diagnosis for a sick child is often inappropriate because signs and symptoms of these diseases overlap. The correct clinical approach is to treat not single diseases but the sick child as a whole. Until recently, however, training programmes were organized to address only one or perhaps two of these conditions at a time, leading to duplication and incomplete assessment and treatment.

WHO and UNICEF have developed an approach to the integrated management of childhood illness. WHO has led a coordinated effort to develop and issue guidelines for integrated management. Four wall charts, also available in booklet form, guide health workers through the process of assessing the sick child, classifying and treating the child's problems and counselling the mother about home treatment and when to return to the health facility. These guidelines were validated in studies in Ethiopia, the Gambia and Kenya.

An 11-day training course has now been developed to teach health workers at first-level health facilities how to use the guidelines. Practical sessions in clinics and hospitals every morning allow course participants to practise what they are learning under the supervision of an expert clinician. The course provides substantial clinical experience in managing children who present with general danger signs, cough or difficult breathing, acute watery diarrhoea, dysentery and persistent diarrhoea, fever, measles, malnutrition, anaemia and ear problems. Special training is provided in the management of sick young infants (age 1 week up to 2 months). The training covers preventive interventions related to feeding and breast-feeding, the provision of immunizations and vitamin A supplementation.

The *Integrated management of childhood illness* course was pretested in Ethiopia in 1994. After revision, the course was again tested in the United Republic of Tanzania in 1995, with the participation of several categories of health workers. All course participants were able to learn and apply the process for the integrated management of the sick child.

An *Adaptation guide* provides step-by-step procedures for the adaptation process needed in all countries to ensure that treatment and counselling recommendations are appropriate and consistent with local conditions and policies. The first training for 25 WHO staff, consultants and representatives of countries involved in early implementation was organized in Ethiopia in November 1995. The course was followed by a seminar on planning for the introduction of the finalized course in countries and a workshop on the use of the *Adaptation guide*. WHO has started to assist a few "early use" countries in adapting the guidelines and training course, and in planning the introduction and close monitoring of the use of these materials.

Other components of the approach include: a training package on the management of drug supplies at first-level health facilities, developed by WHO in collaboration with the USAID-funded BASICS project, to ensure that the essential medicines needed for integrated management are available in first-level facilities; guidelines on referral-level care of childhood illness; methods and tools to ensure that health workers are followed up after training and their skills reinforced; and a planning guide on interventions for improving family management of childhood illness.

Integrated management of childhood illness is a cost-effective intervention likely to have great impact in reducing the global burden of disease in developing countries.

Communication with programme managers and health workers caring for children is maintained through *Child health dialogue*, a newsletter dealing with prevention and treatment of the main childhood illnesses.

Health of school-age children and adolescents

The world's population of school-age children and adolescents has grown enormously in recent decades. It now numbers over 1 billion, of whom almost 700 million are children of primary school age (6-11 years).

Recent research has confirmed strong links between health, school attendance and educational attainment.

Such social changes as the gradual disappearance of the extended family, rapid urbanization and the extension of telecommunications across cultural and geographical boundaries, put the health and development of many of these young people at risk. The hazards include infectious diseases in the unimmunized, unprotected sexual relations, the consequences of induced abortion in dangerous conditions, sexually transmitted diseases including HIV/AIDS, and tobacco and illicit drug use.

A joint WHO/UNFPA/UNICEF study group was set up to facilitate the development of a common programme for action with countries. A review of the health of young people in developing countries entitled *A picture of health?* was produced jointly with UNICEF. WHO issued a guide to the provision of reproductive health services for young people and a prototype for a regional training course in adolescent health was prepared in the Western Pacific. A series of studies on advertising and operational linkage of reproductive health services was launched in South-East Asia with the participation of young people. Joint WHO/UNFPA meetings on multisectoral planning for adolescent health and teaching of counselling skills on adolescent sexuality and reproductive health, for both French- and Portuguese-speaking African countries, were followed by field projects. Health and youth sector plans were prepared in the Americas, and activities to promote the health of adolescent girls were begun in the Eastern Mediterranean.

Since the use of volatile solvent inhalants is increasingly common in developed and developing countries among younger and marginalized people, phase II of the WHO project on street children – of whom there are perhaps 100 million worldwide – has been launched in cities around the world, and piloted by street children organizations in over 30 countries.

By acquiring health-related knowledge, values, skills and practices, children and youth are better able to pursue a healthy life and to work in adulthood as agents of change for the health of their communities and nations. Recent research has also confirmed strong links between health, school attendance and educational attainment. In this light, efforts to improve school performance which ignore health are ill-conceived, just as are efforts to improve health which ignore education. WHO therefore established an Expert Committee on Comprehensive School Health Education and Promotion to lay the operational foundation for WHO's Global School Health Initiative and provide a roadmap for action into the 21st century. The Committee is supported by international agencies reflecting WHO's highly interdisciplinary approach.

HIV/AIDS and other sexually transmitted diseases. Of the 6 000 new HIV infections every day, more than half are estimated to occur among adolescents. Together with UNICEF and the Commonwealth Youth Programme, WHO produced a guide on strategies to prevent AIDS and other sexually transmitted diseases among out-of-school youth.

Worms. About 40% of the world's school-age children (400 million) are infested with intestinal worms. Schistosomiasis alone affects 88 million children under 15 years of age. Such infestations impair growth and development, cause chronic disability and limit school attendance. A standardized protocol for the control of conditions caused by intestinal parasites in school-age children was consolidated and reviewed in five countries. Protocols adapted to local conditions are now available.

Tobacco and drugs. While per capita consumption of tobacco is slowly falling in industrialized countries, it is rising in developing countries. In some Latin American and Caribbean cities more than half of all young people smoke.

Each year tobacco is responsible for the death of 3 million people around the world. Even allowing for the short-term income that it generates, tobacco is estimated to cost the world over $200 billion per year. If this money became available, it would be enough to double the current health budget of all the developing countries.

WHO focused World No-Tobacco Day 1995 on the economic aspects of tobacco, with the slogan "Tobacco costs more than you think", intended to make all those committed to reducing the threat to future world health from rising tobacco use aware of the power of economics and also aware of the need to get economic policies and health policies moving in the same direction.

Diffusion of the quarterly *Tobacco alert* has increased and, like other promotional materials, this newsletter is now available on Internet. Work in this field with the United Nations and affiliated agencies is also bearing fruit. For example, the World Bank no longer grants loans for tobacco-linked projects; and ICAO adopted a resolution calling for a ban on smoking on all international flights by July 1995.

WHO has continued to develop a system for global epidemiological monitoring and surveillance of substance abuse and related health risk assessment, and is supporting countries in implementing this approach. A study of mortality in injecting drug users was completed. Major primary prevention initiatives were launched in southern Africa, the Caribbean, central and eastern Europe and South-East Asia.

Research is under way on the health consequences of cannabis use, the efficacy of drug treatment, and the role of drug substitution approaches. A report is available on cocaine use and its health consequences in 19 countries. Training materials are being prepared on the management of drug-related programmes for health professionals. Innovative approaches to community-based drug treatment in Asia have been evaluated with a view to their application in other regions. The WHO Expert Committee on Drug Dependence evaluated eight psychoactive substances and recommended appropriate levels of international control for seven of them.

Children need the opportunity to learn the ***behaviour***, skills and knowledge necessary for good health. These include communication and other interpersonal skills, problem-solving and decision-making, and coping with stress, anxiety and other emotions. To this end, WHO, in collaboration with UNICEF, is supporting the introduction of life skills education programmes in a number of schools worldwide.

Health of adults and the elderly

Almost 15 million adults and elderly died in 1995 from heart disease, stroke, or other forms of circulatory disease. About 5 million others died from infectious diseases. Another 6 million were killed by cancer, and over 3 million by external causes such as accidents and violence. In broad terms, these are the main groupings of causes of death among adults and the elderly.

Whether diseases are infectious or noncommunicable, most of them can be prevented, at least to some extent. In relation to noncommunicable diseases, WHO promotes community-based prevention as the strategy to reduce risk factors and morbidity, and increase life expectancy. However, some diseases formerly regarded as noncommunicable have an infectious element.

WHO's INTERHEALTH research project has shown that the situation regarding ***noncommunicable diseases*** in developing countries is similar to that in the industrialized world 30 years ago. Community-based prevention is therefore the strategy that WHO promotes to reduce risk factors, increase life expectancy and reduce morbidity.

Cardiovascular diseases are the leading cause of morbidity and premature death in the industrialized countries and it is now conclusively proven that

Whether diseases are infectious or noncommunicable, most of them in adults and the elderly can be prevented, at least to some extent.

The key to cervical cancer control is health education, early detection and screening, linked to adequate therapy.

the occurrence of those diseases is related to diet. WHO continues to coordinate four major cardiovascular disease research projects: the MONICA Project; the WHO/International Society and Federation of Cardiology study on the pathobiology of atherosclerosis in youth; evaluation of new methods for patient education in hypertension, with the World Hypertension League; and the CARDIAC study.

WHO supports epidemiological surveys in several Member States and a project is under way in collaboration with the United States Centers for Disease Control and Prevention to forecast worldwide frequency of ***diabetes*** up to the year 2050, taking into account anticipated demographic changes.

In support of the development of national programmes for the control of major ***hereditary diseases and congenital malformations***, WHO issued recommendations on the management of neurofibromatosis, cystic fibrosis and thrombophilia; an Asian/Pacific working group on the control of haemoglobinopathies was established; and computerized databases on thalassaemia and congenital malformations were initiated.

Genetic approaches to noncommunicable disease prevention were furthered through an international pilot study on familial hypercholesterolaemia. WHO monitors international human genome research, and guidelines were issued on ethical issues in medical genetics and the provision of genetic counselling services.

INTERHEALTH has revealed unfavourable ***nutrition*** trends globally, with most countries experiencing either high or increasing availability of dietary fat and declining availability of vegetable protein and total carbohydrates, particularly starch.

Following the International Conference on Nutrition convened in 1992 by WHO and FAO, WHO has defined indicators for monitoring progress in countries towards the goals of the conference. WHO's strategy is two-fold: to encourage countries to reduce malnutrition and promote good nutrition; and to provide normative guiding information on scientific issues relating to the prevention, management and monitoring of malnutrition.

WHO, UNICEF and FAO give technical and financial support to countries to develop and implement their strategies, and WHO mobilizes supplementary resources from bilateral aid agencies.

WHO focuses on diet-related noncommunicable diseases such as cancer and heart disease in addition to the areas that it emphasizes in relation to infant and child nutrition. In collaboration with other international agencies, it implements a strategy for dealing effectively with nutritional emergencies in large populations.

Forty-seven of WHO's Member countries in five regions have adopted education programmes aimed at preventing noncommunicable diseases related to lifestyle and diet.

Cancer is a growing health problem in developing countries, where some 3.5 million of the global total of over 6 million cancer deaths occur. It is becoming increasingly clear that an infectious agent contributes to many cases.

The key to cervical cancer control is health education, early detection and screening, linked to adequate therapy. Recognizing that cervical cancer control is feasible, even in developing countries, WHO has pioneered pragmatic, realistic approaches for early detection by visual inspection, for affordable radiotherapy and for provision of pain and symptom relief in incurable cases.

The International Agency for Research on Cancer (IARC) coordinates and conducts epidemiological and laboratory research aimed at developing scientific strategies for cancer prevention. It adds to skills and information at country level through its programme of education, training and publications.

The results of evaluation of the carcinogenic risk to humans posed by a variety of exposures are published in the IARC Monographs series. One volume appearing in 1995 provides conclusive evidence of the role of human papilloma virus, mentioned above, as a cause of cervical cancer. Other IARC programmes assess the efficacy of various methods of screening for precancerous and cancerous lesions of the cervix, and assess potential vaccines against human papilloma virus.

Evidence is mounting that infection with the bacterium *Helicobacter pylori* may also lead to stomach cancer. IARC is evaluating strategies to eradicate the bacterium as a means of prevention (see Chapter 1, pages 59–62).

During the International Conference on Population and Development, held in Cairo in September 1994, it was recognized, thanks to WHO, that ***reproductive health*** is central to health in general, and thus to socioeconomic development. The burden of reproductive ill-health falls overwhelmingly on women, in terms of unwanted pregnancy, unsafe abortion, reproductive tract infections and cancers, and complications of pregnancy and childbirth.

WHO's activities focus on advocacy for a more integrated approach that addresses people's reproductive health needs throughout life and reaches a wider audience – women, young people, service providers, policy-makers and community groups. WHO has set up a new reproductive health programme that brings into a more coherent framework programmes dealing with different aspects of the subject, to ensure better coordination of research and technical support activities. The new programme will draw up a comprehensive strategy, define norms and standards, and develop technical tools for addressing reproductive health concerns in countries.

Psychological problems such as depression and generalized anxiety that seriously affect the lives of millions of people worldwide are often not treated or even recognized. These and other ***mental health*** problems represent at least 10% of the total burden of disease. Those affected are more disabled in everyday life than persons with common chronic physical conditions such as arthritis, back pain and diabetes, and the numbers of people affected and the impact on quality of life make such disorders a major public health problem and a great burden on individuals, their families and their communities. WHO therefore supports the incorporation of research and appropriate action into public health programmes and strategies in countries, as well as training directed to that end.

The Organization completed a review of mental health legislation analysing 55 jurisdictions in all six of its regions, on the basis of which it produced a guideline document on approaches to updating legislation or introducing new laws and regulations.

Approximately 45% of the world's population make up the global workforce. This group sustains the economic and material basis of society which is thus crucially dependent on its working capacity. Hence, ***occupational health*** and the well-being of working people are not only prerequisites for productivity but are of the utmost importance for overall socioeconomic and sustainable development.

The workplace is often a hazardous environment. Occupational health and safety hazards are common in many economic sectors and affect large numbers of workers. Some 120 million accidental injuries with 200 000 fatalities resulting from work-related hazards, and up to 157 million new cases of occupational diseases and other illnesses caused by various exposures at work occur each year in the world.

The structure of economies is rapidly changing with the advent of new technology, new divisions of work and new trends in the social environment. In response to these changes and in order to meet emerging challenges, the global network of WHO collaborating centres for occupational health, comprising 52 national institutions in 37 countries (both developing and industrialized), was established.

On the basis of a situation analysis using available indicators, WHO has drawn up a global strategy which highlights the need for broad-based action in view of the occupational health situation in the world, the major impact of work on health, and the continuous transformations taking place in working

Reproductive health is central to health in general, and thus to socioeconomic development.

life. Against this background, it presents principles of modern occupational health and identifies the international and national action needed for global development of occupational health.

The number of years that people now live and the ***quality of life*** that they enjoy most often depend on health conditions dating from very early in their life. Substance abuse (such as smoking, alcohol or drug use), poor living environments, inadequate nutrition and reproductive ill-health, are all major factors contributing to the poor health status of people as they age, wherever they live in the world, and their latter years are often characterized by disability, chronic ill-health, poverty, loneliness and alienation.

The number of years that people now live and the quality of life that they enjoy most often depend on health conditions dating from very early in their life.

In collaboration with 15 centres in 14 countries, WHO has also developed a measure of quality of life (WHOQOL) which will complement established methods of assessing health status in terms of disease with means that use positive measurements of health.

Trachoma, although it begins in childhood, has its main impact on adults. It is a major preventable cause of ***blindness*** in developing countries. WHO produced a guide to fostering community support for trachoma control – a key requirement for ensuring effective antibiotic treatment and improving personal and environmental hygiene – in collaboration with the Edna McConnell Clark Foundation. WHO is closely monitoring the possible application of a new antibiotic effective against trachoma, which could be administered in a few doses per year at low cost.

A standardized proforma for assessing ***hearing impairment*** and its causes has been produced by WHO. Inappropriate use of ototoxic drugs has been identified as a possible preventable cause of hearing impairment. The development of simple ear care as part of primary health care was promoted in various ways including the organization of a joint international symposium with collaborating institutions in the United Kingdom and an African regional workshop in Nairobi.

As part of its efforts to promote ***oral health***, WHO supports standard data-based planning, standard prevention of common conditions, development of affordable treatment systems and production of appropriate personnel, and promotes oral disease prevention. In that connection, the international milk fluoridation programme has expanded considerably.

The WHO community-based ***rehabilitation*** strategy is the best means of providing services and equalizing opportunities for persons with disability as part of primary health care, backed by an adequate referral system. Because specialized staff are lacking in many countries, the Organization works with countries to improve the rehabilitation skills of general practitioners, nurses and other primary health care workers. In cooperation with Swedish educators and health professionals, WHO has drawn up recommendations on training programme managers in community-based rehabilitation.

As rehabilitation is concerned not only with improving functional skills but also with restoring dignity, it is essential to involve the community, making the social environment of the disabled more responsive to their human rights. Account must be taken of people with special needs, such as refugees, slum dwellers, nomads and indigenous populations. A seminar for French-speaking African countries on a multisectoral approach to rehabilitation was held in Abidjan with support from ILO and UNESCO.

Guides were produced on strengthening disability prevention and rehabilitation in basic nursing education and within primary health care services, for the use of district health and rehabilitation managers.

The Organization provides worldwide leadership in the field of ***aging and health***, a dominant social issue for the year 2000 and beyond. WHO's approach is based on a life course perspective, the promotion of healthy aging, the importance of cultural settings for health status, recognition of gender differences in health and factors affecting health, and ethical considerations. Research includes such topics as physical activity, osteoporosis, incontinence, and uses of modern technology for improving quality of life in old age. A major focus for WHO is on healthy aging in women, given estimates that the number of women over the age of 65 will increase from 188 million in 1990 to 326 million in 2015, the majority of whom will live in developing countries.

The third meeting of the WHO Global Commission on Women's Health focused on the health conditions that women face in later life, which to date have not been adequately addressed, the conditions responsible for determining and accelerating the health consequences of aging throughout women's life span and the strategies that will help older women enjoy good health and an improved quality of life.

A peer review process examining work done over the last eight years and involving experts from around the world helped to establish research priorities on healthy aging, with special emphasis on the situation in developing countries. Collaboration with academic institutions is now being established.

Environment and lifestyles

Safe water and basic sanitation are major determinants of health. The growth of the human population and its increasing exploitation of limited natural resources, and the pollution of air, water and land are major threats. Deforestation, desertification, depletion of the ozone layer and climatic change all have health implications of a global nature, as does rapid urbanization.

As ***water supply and sanitation*** are more likely to be sustainable when managed at community level, WHO is cooperating with the UNDP/World Bank water and sanitation programme and with UNICEF to develop participatory approaches in this area – which can also be effective in stimulating changes in hygiene behaviour and improvements in sanitation.

At the end of 1990 the WHO/UNICEF Joint Water Supply and Sanitation Monitoring Programme estimated that out of a total population of the world's developing countries of 4.1 billion people, 1.6 billion were without access to an adequate and safe water supply and a little over 2.8 billion were without access to appropriate means of excreta disposal. The Child Summit has set goals of closing the gap by 25% for water supply and 10% for sanitation for 1995; i.e. reducing the number of people without water services from 1.6 billion to 1.2 billion, and reducing the number of people without sanitation from around 2.8 billion to a little more than 2.5 billion.

In global average terms, the target for water supply has been met, with the most significant progress being made in Asia and the Pacific. Unfortunately, the sanitation target has not been met, and in some cases the population without access to appropriate sanitation has risen – for example in Africa – with population increase a major contributing factor.

As coordinator of the Water Supply and Sanitation Collaborative Council's working group on promotion of sanitation, WHO supports several initiatives to raise awareness of the need for improved sanitation, and promotes the partnership roles of international agencies, donors, ministries, NGOs and academic institutions in this respect.

The Healthy Cities movement has gained ground rapidly and regional networks are now operational or soon will be in all WHO regions. Direct links have been established between cities in Latin America and Europe, and among French-speaking cities in three continents.

The launching of the network of Healthy Cities has resulted in specific environmental improvements, for instance in reducing ***urban air pollution***. The thrust of the air pollution monitoring network forming part of the Global Environmental Monitoring System has shifted from simple assessment of the problem to identification and control of emission sources. Capacity for manage-

The launching of the network of Healthy Cities has resulted in specific environmental improvements.

ment of air quality has been assessed in 20 cities to identify immediate needs for technical cooperation, particularly in introducing comprehensive management strategies and measures.

WHO is concerned by the increasingly serious problem of ***health care wastes***. Case studies have demonstrated a high risk of infection when such wastes are disposed of together with municipal garbage without specific controls. A comprehensive strategy on medical waste disposal from urban areas, covering hospitals as well as the private sector, has been established in collaboration with UNDP, the World Bank and the United Nations Centre for Human Settlements.

WHO is developing an action plan in the areas of ***health promotion*** and ***health education***, leading into the 21st century. Infrastructures are being built up around existing economic or other arrangements and the regional structure of WHO. Programme development in southern Africa is progressing satisfactorily, with South Africa taking the lead, and in eastern and central Europe with Hungary as the hub. A health promotion and education alliance is developing between the more populated countries, including China, India, Indonesia, the Russian Federation and the United States. Two new collaborating centres were established in Australia (Sydney) and Canada (Toronto), bringing the total to 16.

WHO pays particular attention to school health. In September 1995, its Expert Committee on Comprehensive School Health Education and Promotion provided leadership in directing the global school health initiative, and for school health into the next millennium.

A network of health-promoting schools is being built up in several WHO regions. Also, guidelines on helminth eradication have been prepared, as well as a school health bibliography.

High on the agenda of many countries facing rapid economic, political and social change in the 1990s is the question of health system reform.

Health care, organization and management

Health infrastructure

WHO works with countries and the world health community to focus action on achieving a number of goals and targets. Success in this area lies not simply in specifically focused actions, but also in knowing which issues are important, and why they are, and then planning and managing the strategies, policies and resources to tackle them. Infrastructure can be described as the capacity to implement and sustain specific and focused action while also using that action to achieve broader ends.

High on the agenda of many countries facing rapid economic, political and social change in the 1990s is the question of ***health system reform***. In any reform process, a wide range of options exists, relating mainly to financial arrangements, institutional and organizational structures and service delivery.

A framework for research to support improved urban health services is being set up. Recognizing the growing disparities in health service performance and health status in both industrialized and developing countries and the implications for policy-makers and managers, WHO and the Swedish International Development Authority launched an initiative to improve monitoring and global awareness of such trends.

Based on studies on the relevance of user charges, WHO is preparing a position paper that outlines requirements and implications of financing mechanisms for improving health care delivery at the community level.

In the context of civil service reform in response to economic stringency, WHO held a consultation with the Danish International Development Agency to review health care functions and structures prior to strengthening ministries of health. A manual is being produced on health ministry reorganization for a group of countries in the Americas with similar problems.

To promote quality assurance in hospitals and health centres, guidelines were issued on the use of standards and measurement of performance. Because of the waste of resources and decreased quality of care resulting from poor management of health care equipment, WHO produces guidelines on managing physical resources. The Organization helped create an African federation for technology in health care with its secretariat in Cape Town (South Africa). A subregional project on equipment maintenance is under way in Central America.

A network of centres and activities collaborating with WHO in all regions serves as a source of health research expertise; and a health system research network linking North, Central and South American countries was set up. Regional task forces for health systems research were established in the Eastern Mediterranean and in South-East Asia. In Europe, the focus is on countries of eastern Europe, where health systems research is especially weak.

WHO launched an initiative for reorienting **medical education** and public health training towards the 21st century, and jointly organized a meeting in Cape Town (South Africa) with the World Federation for Medical Education.

WHO supports training in health care financing and health insurance and in quality assurance. Up to now some 1 000 health workers from the public health sector as well as NGO facilitators have attended courses for trainers.

Bolivia, Mexico and Zimbabwe took practical measures to establish an optimally balanced and productive workforce, setting up management information systems on nursing/midwifery personnel in primary health care, with support from WHO and the Kellogg Foundation.

As part of an effort to improve the cost-effectiveness of nursing and midwifery services, WHO and its network of nursing/midwifery collaborating centres have been determining the extent to which countries make assessments of their needs for nursing personnel, and have so far received more about 140 replies to the survey.

Networking to disseminate experiences, information and expertise is facilitated through issue of the *Bridge* newsletter; the *Directory of health services and systems research centres*, of which a third edition appeared in 1995; the *Directory of training programmes in health services research*; the Current Concerns series dealing with economics and financing issues; and manuals and reports on specific topics. A newsletter, *Changing medical education and medical practice*, is distributed twice a year. It aims to describe initiatives worldwide to make medical education and practice more responsive to people's health needs.

Table 5. Distribution of WHO fellowships, 1994–1995

Subject of study (with examples)	Number of fellowships Africa	Americas	Eastern Mediterranean	Europe	South-East Asia	Western Pacific	Total	% by subject
Undergraduate studies (medicine, pharmacy)	79	0	10	22	62	44	217	*4.3*
Postgraduate specialities (paediatrics, surgery)	43	49	217	5	402	151	867	*17.2*
Postbasic/graduate nursing/midwifery education (community nursing, clinical specialities)	26	42	35	3	52	104	262	*5.2*
Public health sciences (epidemiology, health economics)	151	215	475	39	735	379	1994	*39.6*
Diagnostic and laboratory sciences (radiology, laboratory techniques and services)	33	29	206	4	221	102	595	*11.8*
Education, communication and research (health education, medical librarianship)	70	19	173	4	231	152	649	*12.9*
Environment sciences (water, sanitation, housing)	22	8	147	3	189	76	445	*8.8*
Total	**424**	**362**	**1263**	**80**	**1892**	**1008**	**5029**	***100***
% by region	***8.4***	***7.2***	***25.1***	***1.6***	***37.6***	***20***	***100***	

Box 15. Renewing the health-for-all strategy

Health is a basic human right and a worldwide social goal. It is essential to the satisfaction of basic human needs and the quality of life, and is to be attained by all people. Concerned over the unsatisfactory health and related socioeconomic situation and the widening gap in the levels of health both among and within countries, the Member States of WHO decided in 1977 on an intermediate goal of achieving, by the year 2000, a level of health for *all* peoples in *all* countries which would permit them to work productively and participate actively in the social life of their community. This was referred to as *Health for All by the Year 2000*. The International Conference on Primary Health Care, held in Alma-Ata in 1978, endorsed the goal of Health for All by the Year 2000 and declared primary health care to be the key to achieving a *minimum* level of health below which no country or individuals within countries would fall, the minimum level of health being interpreted by each country in the light of its socioeconomic and health situation. In 1981, a global strategy was adopted to achieve this goal.

The Member States of WHO also decided that progress towards this goal was to be measured against a set of targets to be achieved by all countries. For example, the target for life expectancy at birth in the year 2000 was set at over 60 years; the infant mortality target was set at below 50 per 1 000 live births. A review of progress in 1995 showed that the number of countries with a life expectancy at birth of over 60 years has increased from at least 98 (with a total population of 2.7 billion) in 1980 to at least 120 (with a total population of 4.9 billion) in 1995. The number of countries meeting the infant mortality target had risen from at least 77 (with a total population of 1.3 billion) in 1980 to at least 103 (with a total population of 3.2 billion) in 1995.

Overall in the last 15 years, there have been substantial improvements in global health status. Disparities between the developed and the developing world have been reduced, but those between the developing world and the least developed countries as a group have widened. Gaps have also widened between population groups within countries. In recent years, health gains have slowed down and even been reversed in some countries.

In 1994, recognizing the change that had occurred in the global context since the adoption of the strategy. WHO's Member States restated the validity of health for all as a global vision and identified the need to formulate alternative plans for attaining further targets for the year 2000 and beyond.

WHO's vision of global health based on equity and solidarity calls for the building of new partnerships and the adoption of an innovative and pragmatic agenda for international health extending beyond countries or regions.

The Organization has already begun a consultation process on renewing the strategy. Renewal does not mean extending the time-frame, but visualizing health in the early 21st century, and setting further intermediate targets for achieving health for all and renewing efforts to meet the challenges, by exploiting opportunities and overcoming threats and obstacles. It is envisaged that the World Health Assembly in May 1998 will renew the commitment of Member States to the universal goal of health for all and to any adjustments or new directions that may be warranted in the strategy for achieving the intermediate objectives and targets for the year 2005, 2010 or as appropriate.

Rapid changes in the personal, social, economic, environmental and other determinants that influence health make it necessary for health care providers constantly to reassess their knowledge and reorient their methods. A highly effective means for this purpose is exchange of experience among countries with different health systems. WHO, through its fellowships programme, provides opportunities for carefully selected health professionals to obtain the necessary skills to direct, guide and support health development in their countries, within the framework of careful human resources planning and clearly defined priorities (*Table 5*).

Health policy

This section is concerned with the ways in which WHO shapes **global health policy** through its directing and coordinating functions. Since 1948, WHO has provided leadership for global health programmes and initiatives. However, the Organization has recently faced critical challenges as a result of worldwide political, economic, social and health changes. To ensure that WHO maintains its leadership in the health sector, its governing bodies have reviewed in depth the extent to which the Organization could make its contribution even more effective.

A new aspirational health policy is being worked out in consultation with Member States and other partners in health to give broad guidance for health development in the 21st century (*Box 15*).

The pursuit of development in the economic, educational or health spheres in isolation may obscure the purpose of development as a whole – to improve the quality of life of all people. WHO's perspective is that social and economic gains can be pursued simultaneously and that they are mutually beneficial and in turn contribute to alleviating poverty. WHO therefore focuses on protecting and promoting the health and well-being of the most disadvantaged groups. At the World Summit for Social Development, held in Copenhagen in March 1995, WHO advocated strengthening partnerships for health development and mobilizing the political commitment to view it in the context of economic and social development.

The net result of continuing poverty is growing inequality between countries and between groups and areas within countries. For example, by 1994 there were 47 least developed countries in contrast to 27 in 1971. To this end WHO directs action and resources in a country-focused rather than a programme-oriented approach, emphasizing the links between poverty and ill-health through its specific focus on ***intensified cooperation with countries and people most in need***. This initiative has 28 participating countries. Through it, for example, WHO has cooperated in developing health policy, strengthening health systems in countries such as Guinea and Zambia and in putting sustainable health financing schemes in place. The Organization gives technical support for upgrading country capability in health economics, enabling countries to make pragmatic changes easing the transition from centrally planned to market economies.

In the context of its advocacy and technical advisory role, WHO gave technical support to ensure the inclusion of health considerations in economic development projects in Burkina Faso, Guatemala, Mali, Mongolia, Rwanda, Togo and Uganda. A joint UNESCO/WHO conference held in Geneva in February 1995 was attended by representatives of ministries of finance, education and health from 15 French-speaking African countries. One of its conclusions was that proper management of drug procurement and distribution would substantially mitigate the effects of the CFA franc devaluation on health and education.

WHO works towards a more focused and increased flow of external funds and their more effective use by countries. The Organization brings together countries engaged in health reform and principal extrabudgetary donors, and issues advocacy articles on poverty and health. WHO also works to develop coherent thinking and consensus among donors on aid policy for the most needy countries, for example, using a country typology, based on capacity to lead the development process.

The Organization is working with multilateral bodies such as UNDP, the World Bank and regional development banks, the European Union and bilateral donors – leading to joint projects, donor commitment and the mobilization of over $700 million for health in 1994-1995.

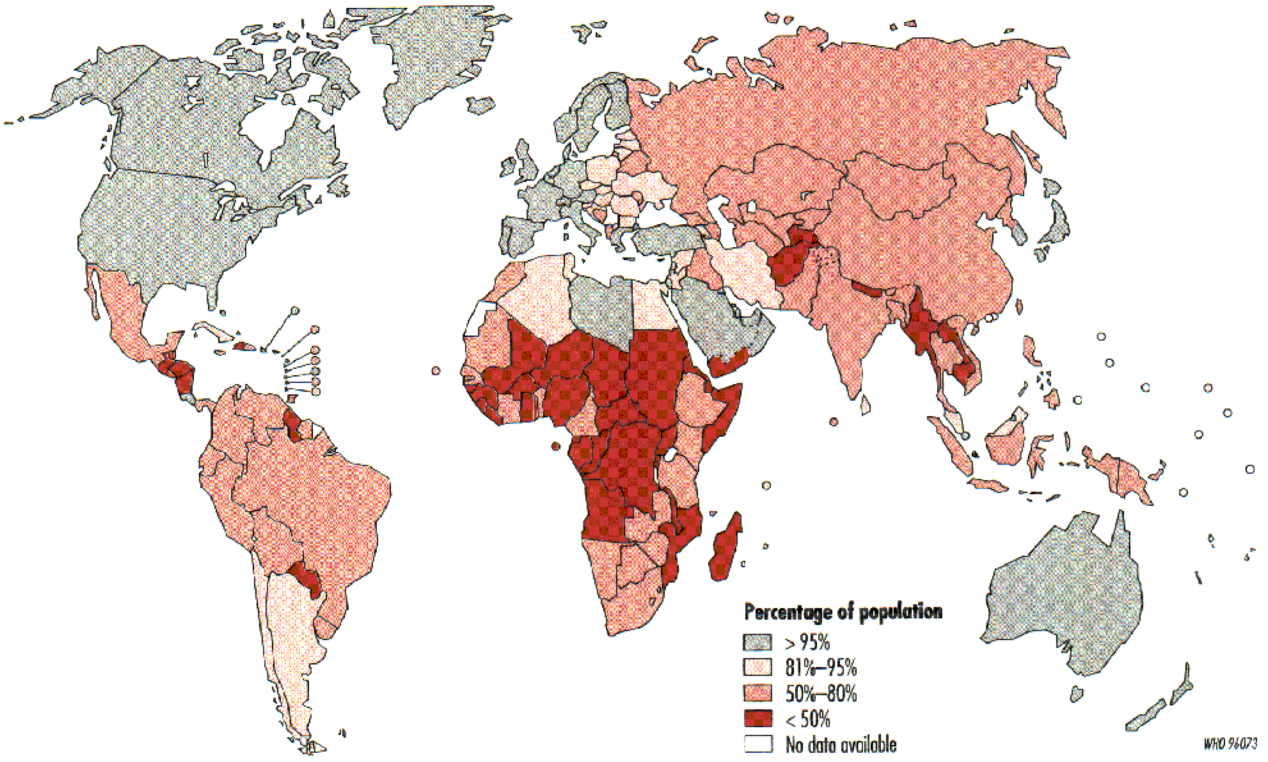
A substantive study of WHO's external funding, sponsored by the governments aid agencies of Australia, Norway and the United Kingdom, was carried out with a view to making further improvements in the means by which WHO influences the mobilization of funds and coordinates and orients the ways in which they are spent.

The ability to treat many diseases is affected by factors influencing the availability of ***essential drugs***, such as logistics, resource availability and sheer demand. Health sector reforms often place emphasis on the private sector but this does not necessarily enhance access. Government responsibility is critical and many countries urgently require new and enforceable legislation and regulations on drugs. The international environment resulting from GATT/WTO agreements may however improve drug availability in some countries. Nevertheless, inappropriate drug use in developed and developing countries remains a cause for concern. WHO therefore supports countries, including those in the newly independent States, to ensure that essential drugs are available (*Map* 8).

WHO's quality standards for pharmaceutical products are the kind of internationally agreed standard that the Agreement on Technical Barriers to Trade encourages governments to adopt as a basis for national regulations. Four South American countries, for example, adopted WHO's requirements for good manufacturing practices for pharmaceu-

WHO works towards a more focused and an increased flow of external funds and their more effective use by countries.

Map 8. Populations with regular access to essential drugs, 1995 estimates



tical products in order to harmonize regulations within their trade group (Mercosur), and a number of OECD countries decided to eliminate customs duties on pharmaceutical ingredients bearing a WHO international nonproprietary (generic) name (*Box 12*, page 68).

The ***health and well-being of women*** influences also their children and families, their communities and society as a whole. Shaping the development of policies aimed at investing in and improving women's health is a priority for WHO. Ill-health and malnutrition in one generation of women can be followed by a cycle of ill-health in the next generation. Women's status and health also affect household incomes and national productivity.

The Fourth World Conference on Women in Beijing in September 1995 was the culmination of a series of major international conferences dealing with women's health and development. The Platform for Action set up at Beijing addresses all the many determinants of women's health such as the environment, violence and education.

In the sphere of ***health and the environment*** WHO provides a forum for addressing global concerns, as for example when it brought together some 600 scientists, researchers, public health specialists and policy-makers from 59 countries in the first of three international conferences concerned with the effects of the Chernobyl disaster.

The International Programme on Chemical Safety is another example – a joint activity at international level between WHO, UNEP and ILO to provide internationally evaluated scientific information on the basis of which countries can develop their own policies and measures to protect human health and the environment.

The issues confronting the world health community guide WHO's ***research*** policy, which is geared to catalysing the search for knowledge and technology to meet known and emerging health needs. WHO carries out its own research and also stimulates research in the international health community in liaison with the world scientific community, other international and national agencies and organizations, the WHO Advisory Committee on Health Research (*Box 16*) and WHO's many expert committees. It thereby stimulates and supports the development of health research policies and research capacity in countries.

WHO's work includes research on nutritional deficiency disorders, communicable and noncommunicable diseases, and issues in management of health systems. In conjunction with Member States WHO also collaborates with several intergovernmental and nongovernmental organizations concerned with the ethical dimensions of health care. Some 1 200 collaborating centres and the 2 000 or so members of 55 WHO expert committees and advisory panels contribute to WHO's research work in all fields.

In 1995, WHO's Executive Board endorsed the creation of a research centre to be established in the City of Kobe, Japan, to contribute to the international work of the Organization. It is the first time that WHO will deal with an initiative from local government and the private sector combined. The Centre will carry out research into health development, and the interrelationship between social, economic, environmental and demographic factors and health. It will bring together researchers from a wide range of disciplines relating to such areas as biomedicine, public health, sociology and the behavioural sciences, development economics, demography and environmental sciences. The Centre will be part of a network of centres worldwide undertaking research in collaboration with other institutions, in both industrialized and developing countries.

The Organization monitors and analyses advances in medical, biological and behavioural sciences and ***health technology*** and identifies developments that can be used directly or be further pursued to solve problems in health care.

Box 16. The Advisory Committee on Health Research – a catalyst for scientific cooperation

Research promotion and development in the health field is one of the constitutional functions of WHO, which promotes and initiates research activity at national and international levels. The global Advisory Committee on Health Research (ACHR) and the regional ACHRs were established to guide the work of WHO in the area of medical and health research.

With the adoption in 1981 of the Global Strategy of Health for All by the Year 2000, the scope of WHO's research functions and activity was broadened to address research issues in policy, organization and management aspects of health care delivery at primary level. Studies are required on the multisectoral determinants of health such as poverty, illiteracy, unemployment and environmental degradation with a view to developing mechanisms for improving health and coverage, effectiveness and efficiency in health services delivery. The ACHR recognized the increasingly complex challenges posed and decided to mobilize and exploit all available knowledge and skills in the medical, behavioural, technological and environmental sciences so as to find the appropriate scientific answers to health development problems. WHO began expanding its relationship with scientific institutions beyond the existing formal and informal programme-related networks, and now relies on tens of thousands of scientists worldwide to provide research and training facilities.

To complement the leadership role of WHO, ACHR is becoming a catalyst, seeking constructive cooperation at the global level with governmental and nongovernmental organizations, identifying the problems and suggesting solutions based on scientific evidence. In this way resources and creativity are being pooled to improve health, health services and health development.

The ACHR reaches out on the one side to governments and on the other to the scientific community, research institutes, universities and all those concerned with scientific endeavour, in order to make an impact on the dynamics of global health development. To this end, WHO and all members of the global and regional ACHRs are also being connected by means of modern telecommunications technologies so as to harmonize and rapidly disseminate scientific advice as it becomes available.

One of WHO's principal responsibilities under its Constitution is to monitor health status and trends nationally, regionally and globally and to make this ***health information*** available to all. In 1995, WHO launched the first *World Health Report*, intended to reach the lay public as well as policy makers and health professionals. The aim of this new publication is to annually update information on the global health situation, and draw attention to priority health problems.

The third monitoring of progress in the implementation of strategies for health for all by the year 2000 was carried out by Member States, and reports were submitted to WHO's governing bodies in 1995.

Box 17. Dear WHO, can you help us?

Every month WHO receives over 7 000 requests for copies of its manuals, guidelines, recommendations, statistical data or official advice on any number of public health problems.

Several factors help explain this demand. WHO publications are always issued in response to a need, whether expressed by a Member State or detected during a technical programme's work. In most cases only WHO can fill this need. The Organization's status as the global health authority makes it uniquely well suited to issue international guidelines and norms in areas ranging from permissible levels of contaminants in food to quality standards for pharmaceutical products.

Even more important is WHO's commitment to the health needs of poor people in poor places – "orphan" needs that are rarely a priority for commercial publishers. Though the Organization's international guidelines and standards serve the world, most of its practical handbooks and "do-it-yourself" manuals respond to health problems in developing countries, where the need is always greatest and where WHO publications are welcomed as a link to the best expertise. In the many countries that cannot afford to subscribe to the host of specialty research journals, WHO publications do the research for them. State-of-the-art consensus reports, such as those published in the Technical Report Series, allow countries to skip a costly and time-consuming step in the process of acquiring reliable advice.

WHO publications also enable developing countries to communicate their experiences to the world at large. Experts from the developing world are always well represented among the pages of WHO publications. During 1995, for example, the *World health forum* published 116 contributions from 47 countries, of which 31 were in the developing world.

When gathering and issuing information, WHO puts the developing world first. One of the Organization's strengths is its ability to work out low-tech solutions to high-tech problems. Lists of essential drugs, manuals explaining the use of oral rehydration salts or multidrug therapy for leprosy, and how-to guides on topics ranging from the construction of sanitary facilities to the interpretation of radiographs and ultrasound scans are just some examples.

When issuing advice on health problems in developing countries, WHO draws on the very best expertise, edits to achieve the precision and clarity needed by people who are reading in a foreign language, and designs text and illustrations to make comprehension easier. As a result, information produced by WHO for developing countries is often relevant to industrialized countries as well.

http://www.who.ch

WHO also serves the information needs of the many professionals who seek instant electronic access to the latest health data and statistics. The WHO home page on the World Wide Web makes it easy for Internet users to retrieve up-to-date health-related data on a range of topics. Users can find descriptions of the major programmes coordinated by WHO, global and country-specific health statistics, country profiles, WHO events attracting media attention, data on individual diseases, and alerts to outbreaks. Also instantly accessible are information about important WHO publications, the contents of newsletters and press communications, and reference to the more than 60 000 items in the WHO library database. The full texts of frequently referenced publications are likewise available. Users can access the contents of the *Weekly epidemiological record*, which serves as a "bulletin board" for disease news, or browse *The World Health Report* summary.

The WHO home page enables the user to retrieve information about the regional offices, country activities, WHO collaborating centres, and depository libraries where complete collections of WHO publications are maintained. For more specialized information within the United Nations family, links are provided to the home pages of the WHO Regional Office for Europe, the Pan American Health Organization, the International Agency for Research on Cancer, and other UN agencies.

WHO supports Member States in the application of the International Health Regulations and disseminates epidemiological information through its automatic telecommunications reply services and by issuing the *Weekly epidemiological record* and *International travel and health*. As an example, WHO provided data charting the course of the outbreaks of Ebola haemorrhagic fever in Zaire in 1995.

Publication of volumes of the tenth revision of the International Statistical Classification of Diseases and Related Health Problems continued, and it has already appeared in more than 30 languages. The English-language version of the Classification is now available on diskette. The International Classification of Impairments, Disabilities, and Handicaps is under revision.

A new strategy for strengthening national health information systems has been initiated and a series of methodologies and products for use by countries in assessing and enhancing various components of their health information systems have been produced, for example, a catalogue of health indicators recommended for programme management, and an updated version of training modules in health statistics.

Activities have focused on Africa and newly independent States. Eleven countries and four regional meetings were supported in 1995.

The scientific community can now also access a special bulletin board through Internet. In addition to gathering and providing epidemiological information to countries and to the world health community, WHO supports countries in enhancing their own health information systems. It ensures that the information to which it has access and which it generates on health status, health services, technologies, research, legislation, methodologies, resource flows and social issues and on WHO programmes themselves, is made accessible to policy-makers, scientists, doctors, managers and lay people, and to the many national and international organizations working in the health field.

Such information is available in WHO publications as well as on the Internet World Wide Web with the WHO "home page" indicating the many areas of information that can be accessed (see *Box 17*). In 1995, with more than 350 000 "hits" per month, WHO ranked among the top 5% of all World Wide Web servers for the Internet.

Computing, networking and communications, often grouped under the headings of ***informatics*** and ***telematics***, have tremendous potential and are already being used to support health care in both industrialized and developing countries. Libraries on CD-ROM, for instance, have reduced the problem of meeting the hard currency costs of medical literature acquisition for developing countries. Even procurement of the necessary hardware and software and training of staff need not be expensive, as

Box 18. TeleMedicine

TeleMedicine is the practice of medical care using interactive audio, visual and data communications; this includes medical care delivery, consultation, diagnosis and treatment, as well as education and the transfer of medical data. TeleMedicine may be a partial solution to the problem of competing demands for equitable access to good-quality health care services and for reduced expenditure in health care. Such technology is most needed by the poorest countries.

The term "TeleMedicine" is used to refer generically to growing disciplines such as TeleRadiology, TelePathology, TeleCardiology, TelePsychiatry and TeleEducation. The practice of TeleMedicine can be exemplified by three scenarios. It could enable a general practitioner in a rural setting to seek a second or an expert opinion from colleagues in a national specialty hospital. It could enable a remotely located nurse to obtain the technical guidance of a physician. It could enable a physician to look after (examine, monitor or interview) a remotely located patient – for example at home, in another city or country.

TeleMedicine supports any of these scenarios with the transmission of the relevant diagnostic data (an X-ray, a heart beat, a pathological section, an ultrasound or a video film) and the receipt of the corresponding diagnosis and recommended follow-up, with real-time dialogue between the two communicating parties as if they were face to face.

What is required to get it to work? Given agreement between a provider and a recipient of TeleMedicine services, these are then supported on a TeleMedicine infrastructure backed up by a telecommunications infrastructure. The TeleMedicine infrastructure includes hardware and software ranging from a simple facility to scan, compress and transmit an X-ray image, to sophisticated facilities for remote control of surgical equipment accompanied by interactive video. The telecommunications infrastructure requires a communications line (ranging from a simple telephone line to a broad bandwidth line to carry video images and sound) and the means to send and receive digital data.

In practice, TeleMedicine should be viewed as a part of the broader topic of TeleHealth, which includes the use of telecommunications technology and services for surveillance, emergency preparedness and education.

WHO plays a dual role in TeleMedicine. It cooperates with countries in studies on the feasibility and cost-effectiveness of TeleMedicine services and actively participates in scientific forums to identify the needs and problems associated with the wider use of TeleMedicine within individual countries and between countries. Recently in South Africa, WHO helped establish a test link for TeleMedicine between Johannesburg General Hospital and the rural hospital in Tintswalo, some 500 km away; X-ray images of patients taken in Tintswalo were digitized and transmitted to Johannesburg where they were read and interpreted by expert radiologists who also, as necessary, engaged in video-conferencing to discuss certain cases. WHO also supports Kuwait in the comparative evaluation of the requisites, *modus operandi* and costs of TeleMedicine services offered by nine European and United States university hospitals.

Before long, international cooperation in TeleMedicine will become second only to international cooperation in the surveillance and control of infectious diseases.

demonstrated by a cost-effective low earth-orbit satellite project in Zambia for electronic mail (e-mail) and access to international data bases (Internet). Access to expert knowledge to assist medical decision-making is another key area of computer support. Telemedicine allows field workers to obtain advice directly from an expert and to use remotely and centrally placed diagnostic equipment (see *Box 18*). Epidemiological surveillance is probably the field where the greatest use is made of computers.

WHO has collaborated with many countries including, over the past year, Kuwait, Nigeria, South Africa and the Syrian Arab Republic, in introducing or strengthening informatics and telematics to support health care. The network of WHO collaborating centres on health informatics, even though relatively small, contributes significantly to technology evaluation, training and transfer of experience. WHO also contributes to several technical groups and consultations aimed at setting international standards for the use of informatics and telematics in health care within a country and between countries.

One of the components of the UN special initiative for African economic recovery and development deals with health sector reform and disease control.

Coordination

WHO seeks active collaboration with other intergovernmental and nongovernmental organizations active in the health field. Every opportunity is taken to reinforce their contributions to health and to emphasize the importance of health as a component of national development.

Within the framework of the ***United Nations system***, a special initiative for African economic recovery and development has been launched. One of its components deals with health sector reform and disease control, particularly of malaria, cholera, diarrhoea, schistosomiasis, dengue fever and filariasis through improved water supply and sanitation.

The Economic and Social Council continued to debate and endorse action on many issues having a bearing on health, including progress in implementing the global AIDS strategy; control of malaria, cholera and other diarrhoeal diseases; health hazards of smoking; migration; and humanitarian action. The Director-General of WHO drew the Council's attention to the Onchocerciasis Control Programme as an example of a health initiative that is bringing substantial social, political and economic returns.

The United Nations regional commissions have been strengthening collaboration with other United Nations bodies, including WHO, for the benefit of Member countries. For its part, WHO has given the Economic and Social Commission for Asia and the Pacific technical guidance on disease eradication in Asia and the Pacific.

In October 1995, the Administrative Committee on Coordination (of which WHO is a member) agreed on a United Nations system-wide Special Initiative on Africa, to start early in 1996. In order to be effective, health programmes must focus on action at country level, and above all support the policies and programmes decided on by African countries themselves. The ***World Bank*** will play a leading role in resource mobilization for the initiative. Reform of basic health care systems, with particular attention to malaria control, is among the priorities for resource mobilization, as well as water, sanitation and food security.

Action plans have been prepared for implementing the recommendations of the ***Organization of African Unity*** on control of HIV/AIDS. The fifth conference of African Ministers of Health, held in Cairo with WHO support, gave priority to solving health problems of women, including HIV/AIDS, malaria and tuberculosis, within the context of family health. Agreement was reached with the Common Market for Eastern and Southern Africa to extend essential drugs coverage to malaria, HIV/AIDS and tuberculosis.

In 1995, WHO issued an information document, *The African Economic Community: a framework for action by WHO*. At the request of OAU, WHO has provided assistance in the drafting of a health protocol which will become an integral part of the treaty establishing the African Economic Community.

The health sector policy of the ***African Development Bank*** includes provision for prevention and control of major diseases, immunization of children, vector control, and safe water supply and sanitation. WHO is cooperating with the ***Asian Development Bank*** on tuberculosis control in Indonesia and the Philippines. The ***Islamic Development Bank*** made available $90 000 for providing meningococcal meningitis vaccine to Burkina Faso, Mali and Niger under WHO auspices.

WHO continued to work closely with ***nongovernmental organizations*** that are in official relations with it. Through a combination of hands-on support, fund-raising and advocacy, they contributed to WHO's efforts in such fields as control of leprosy and tuberculosis, immunization, prevention of blindness and deafness, and water supply and sanitation. In January 1995 the WHO Executive Board admitted four new organizations into official relations, bringing the total number to 181. This decision was based, among other criteria, on the performance of joint activities. For example, the Inter-Africa Committee on Traditional Practices affecting the Health of Women and Children contributed to the production of a WHO information kit on female genital mutilation; the International Association of Biologists Technicians to training courses in developing countries on detection of sexually transmitted diseases, tuberculosis and opportunistic diseases associated with AIDS and to courses on the maintenance of laboratory equipment; the International Medical Parliamentarians Organization to exchange of information on health policies; and the International Women's Health Coalition to promotion of women's perspectives in reproductive health research.

An emergency task force was established on 1 January 1995 to give a sharper focus to WHO's ***emergency relief programme***, ensure optimal use of resources, and strengthen cooperation with other concerned organizations.

The Organization, as a member of the Interagency Standing Committee, has been increasingly active in United Nations emergency and humanitarian activities, helping to prepare 13 consolidated interagency humanitarian assistance appeals. The Organization assisted in emergency relief efforts in 55 Member States, conducted emergency preparedness activities in 10 and was involved in safety promotion and injury control in 11.

WHO's support for emergency preparedness focused on the establishment of country and regional programmes; the development of technical and normative guidelines; and activities contributing to the International Decade for Natural Disaster Reduction.

WHO contributed to United Nations activities concerned with landmines and the impact of war on children, and set up demonstration projects as part of its safe community initiative.

WHO provided support to Angola in formulating health policy and organizing health services for demobilized soldiers and their families; to Burundi in coordinating emergency health assistance and organizing measures for control of tuberculosis, sexually transmitted diseases including HIV infection, fever of unknown origin, malaria, cholera and dysentery; to Liberia in forming water and sanitation teams to combat cholera and providing urgently needed supplies for safe blood transfusion; and to Cape Verde and Mali in controlling malaria.

Activities in Rwanda focused on the re-establishment of the national epidemiological surveillance system, HIV/AIDS prevention and control through safe blood transfusion, control of water quality and restoring hospital and mental health services. In addition, a mapping software was developed to allow the detection of trouble spots and monitoring of trends in communicable diseases.

In Sierra Leone WHO helped to set up an early warning system on epidemics; supported a workshop on diarrhoeal diseases and acute respiratory infections;

An emergency task force has been established to give a sharper focus to WHO's emergency relief programme.

and provided supplies including laboratory reagents to control an outbreak of cholera.

Emergency activities in the United Republic of Tanzania initially centred on health assistance to the 700 000 refugees from Rwanda and Burundi. WHO is currently helping to meet the needs of local residents whose health status is now inferior to that of the refugees.

In the Kivu camps in Zaire which shelter 1.2 million refugees from Rwanda and Burundi, activities are being reoriented to target assistance to the local population. WHO also supported laboratory services in Goma and control of the acute phase of the epidemic of Ebola haemorrhagic fever in Kikwit, Zaire. More than $3 million in cash and in kind were mobilized for the emergency.

WHO supported control of the acute phase of the epidemic of Ebola haemorrhagic fever in Kikwit, Zaire.

WHO assisted Iraq in procuring lifesaving drugs and medical supplies that could not be imported owing to shortages of foreign exchange. Some $5.6 million was used to support the nascent Palestinian health authority in late 1994 and 1995. WHO took part with the health authorities, UNICEF and NGOs in a mass immunization campaign in Afghanistan, which has so far protected 2 million children and over 800 000 women.

WHO collaborated with the United Nations Disaster Assessment and Coordination (UNDAC) in assessing needs following an earthquake in Indonesia and severe flooding in the Democratic People's Republic of Korea and the Lao People's Democratic Republic – where assistance was also given in mobilizing international support to control a cholera outbreak. The Organization continued to monitor the health situation following floods in Bangladesh, China and India.

WHO-coordinated international health assistance to the countries of former Yugoslavia focused on supply of medical equipment; operation of public health programmes; health and nutrition monitoring; rehabilitation; and reconstruction of health facilities.

In the Russian Federation, emergency support to Chechnya included coordination of international relief; tuberculosis control; diagnosis and control of waterborne diseases including cholera; immunization; and procurement of supplies for general hospitals.

Following outbreaks of cholera in Albania and Ukraine, WHO provided medical equipment, laboratory materials and chlorinators, and gave courses in diagnosis and clinical management of the disease, and control of water quality.

Public information and promotional work was carried out in connection with major events during 1995, including: in March, the World Summit for Social Development in Copenhagen; on 7 April, World Health Day on the theme of polio eradication; on 31 May, World No-Tobacco Day on the theme of the economics of tobacco; in September, the World Conference on Women in Beijing; and in October, the 50th anniversary of the United Nations.

In 1995, WHO produced 94 press releases, 8 feature stories, 18 fact sheets, press kits and other material for the media. Eleven press conferences were organized on various issues such as the impact of the CFA franc devaluation on health, poliomyelitis eradication, tuberculosis and testing of nuclear weapons. Hundreds of telephone requests for interviews or information were handled during the year, with a peak during the Ebola fever outbreak. Arrangements were made to receive almost 10 000 visitors from 60 countries.

WHO issues a wide range of ***publications***, from guidelines to reports on the latest biomedical research around the world (see Box 17). A highlight of the year was the launching of *The World Health Report 1995*, which became a bestseller and won extensive coverage in the media.

WHO translates a considerable volume of material to meet priority health advocacy needs in various language and cultural settings. Texts are produced in WHO's six official languages – Arabic, Chinese, English, French, Russian and Spanish. The potential of new technologies in referencing, terminology and translation is kept under constant review. During 1995 new agreements were prepared for the translation and publication in non-official languages of 150 WHO titles and, as a result of earlier agreements, 95 published translations were received from around the world.

Sales of publications through the worldwide network of WHO agents exceeded $8 million in the biennium 1994-1995. These sales help to support unpaid distribution mainly to institutions such as libraries, educational establishments, hospitals, research institutes, documentation centres and professional associations where WHO books are available to all users. Arrangements with NGOs, training institutions and aid agencies also help to target distribution to poorer countries. The reach of the 152 WHO depository libraries was extended by a growing network of WHO public reference points – some 900 libraries where comprehensive collections of WHO publications are available for public consultation.

The ***WHO library*** acts as a central purchasing agent for libraries worldwide. An arrangement for the international exchange of health literature provides for the free transfer of books and journals among 214 libraries in 68 countries, while a WHO revolving fund allows developing countries to order material through WHO and to pay for it in their own currency.

Bibliographic data in the WHOLIS database are available to all Member States in different forms: print (WHODOC), online, diskette, CD-ROM and Internet. WHO technical documents are also stored on optical disks from which CD-ROMs can be produced on request.

The ***financial position*** of the Organization was significantly weakened by the shortfall in payment contributions for 1994-1995 together with unfavourable exchange rate fluctuations, necessitating close monitoring of available funds. A major redesign was undertaken of the computerized administrative and financial information system for regional offices, and a much improved system is to be introduced during 1996-1997.

In response to this difficult financial situation, available resources are being prudently used for ***general administration***, to ensure that services such as mailing and telecommunications are efficient, while still enabling the Organization to fulfil its mandate. A number of cost-saving and cost-avoidance measures have been identified, including elimination of some services and replacement of others by new technologies such as optical scanning for records management.

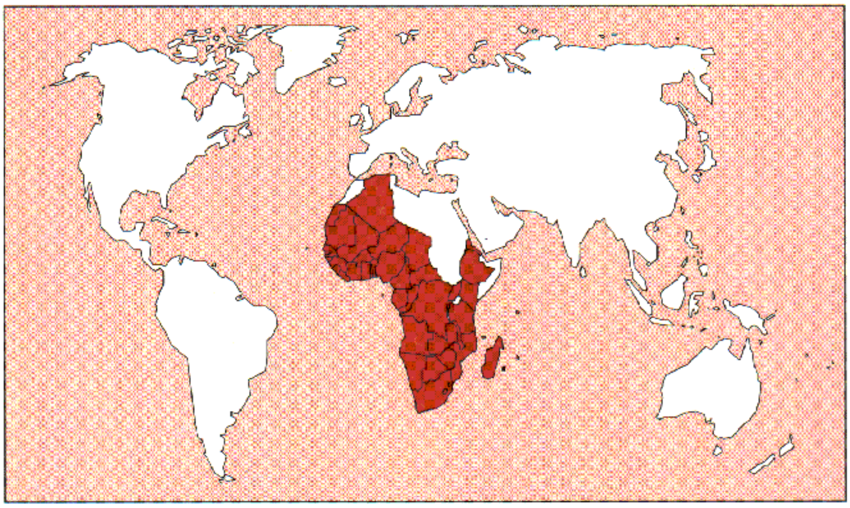
Although the workload of WHO's ***supply services*** was heavier than ever during 1995, the relocation of some activities outside the Organization and restructuring of others made it possible to maintain high-quality performance despite staff reductions. Responding to emergencies such as the outbreaks of Ebola fever in Zaire and plague in India put further pressure on the Organization's resources. An initial supply of antileprosy products worth $10 million was procured for 24 countries worldwide, together with substantial vaccines and other supplies for poliomyelitis eradication.

The main thrust of WHO's ***personnel*** work during the year was in responding to the funding shortfall which necessitated the abolition of over 300 posts in headquarters and regional offices and a substantial reorientation and restructuring of WHO's programmes to address priority health concerns. In spite of a reduction of recruitment due to the budget cuts, emphasis continued to be given to increasing the proportion of women in professional and higher-graded posts and to recruitment from unrepresented and underrepresented countries through active prospection.

Regional highlights

A characteristic feature of WHO is its decentralization. It has "regional organizations", of which there are six, each consisting of a regional committee and a regional office. The regions vary widely in size, socioeconomic development, epidemiological characteristics, culture and history. Highlights are presented in the following pages.

An initial supply of antileprosy products worth $10 million was procured for 24 countries worldwide, together with substantial vaccine and other supplies for poliomyelitis eradication.



46 Members
Population (1995): 585 million

GNP per capita

• Regional average (1993)	$621
minimum: Mozambique	$90
maximum: Seychelles	$6 280
• Annual average growth rate (1980–1993)	
minimum: Côte d'Ivoire	-4.6%
maximum: Botswana	6.2%

Algeria
Angola
Benin
Botswana
Burkina Faso
Burundi
Cameroon
Cape Verde
Central African Republic
Chad
Comoros
Congo
Côte d'Ivoire
Equatorial Guinea
Eritrea
Ethiopia
Gabon
Gambia
Ghana
Guinea
Guinea-Bissau
Kenya
Lesotho
Liberia
Madagascar
Malawi
Mali
Mauritania
Mauritius
Mozambique
Namibia
Niger
Nigeria
Rwanda
Sao Tome and Principe
Senegal
Seychelles
Sierra Leone
South Africa
Swaziland
Togo
Uganda
United Republic of Tanzania
Zaire
Zambia
Zimbabwe

Africa

In Africa, the main causes of illness and death of children who survive the neonatal period include acute respiratory infections, diarrhoea, malaria and measles, alone and in combinations, against a background of protein-energy and micronutrient malnutrition. For women they include complications connected with childbirth. For both men and women they include communicable diseases such as malaria, tuberculosis and HIV/AIDS, as well as injuries.

These causes, which often are aggravated by the impact of emergencies and disasters such as armed conflict, drought and famine, in turn are linked to inadequate access to primary and secondary education, safe water and sanitation, safe and nutritious food, essential drugs, and family planning. In some countries, this poverty is further complicated by societal and economic factors, including the low status of women and other vulnerable groups, inequity in the distribution of the benefits of economic growth, underfunding of the health sector, and the impact of a deteriorating economy and various structural adjustment programmes on the social sector.

Implementation of activities is guided by the quest for efficiency in order to make savings for cooperation activities with countries. To that end, stringent budgetary management measures have been introduced in the Regional Office. Similarly, measures are being introduced at all levels of execution of the regional programme in order to contain costs. The savings thus realized have been allocated to the countries hardest hit by the socioeconomic upheavals and natural or man-made emergency situations which are affecting a growing number of countries in the Region. WHO has set up an emergency management mechanism to provide a coherent and effective response. Communication within the Region has been greatly improved. A satellite system has been installed to facilitate telephone contacts and e-mail is in use and will be extended to as many countries in the Region as possible.

Twelve countries have probably eliminated or are about to eliminate neonatal tetanus. This has resulted from the significant increase in the vaccination of women of childbearing age with tetanus toxoid and from improved epidemiological surveillance. Countries have adopted the approach of identifying the districts at risk through active surveillance.

Eleven countries have reported no cases of poliomyelitis, at least during the period 1993-1994; four neighbouring countries in southern Africa have become the first potential poliomyelitis-free zone (Botswana, Lesotho, South Africa and Swaziland). In seven other countries, the incidence has been significantly reduced. In all the countries, emphasis has been placed on increasing vaccination coverage, strengthening surveillance and ensuring a fast and decisive response to epidemic outbreaks of poliomyelitis.

	1980			*1995*			*2000*				
Selected health-for-all (HFA) indicators	*Average*	*Maximum*	*Minimum*	*Average*	*Maximum*	*Minimum*	*Average*	*Maximum*	*Minimum*	*HFA targets*	*No. of Member States which have not met the HFA targets in 1995*
Life expectancy at birth (years)	48	66	35	53	71	40	54	72	42	> 60	38
Infant mortality rate (per 1 000 live births)	117	191	33	93	160	17	85	148	14	< 50	40
Under-5 mortality rate (per 1 000 live births)	188	291	39	145	246	18	131	227	14	< 70	40

In 1994, only four countries met the 90% target fixed for measles vaccination coverage (Cape Verde, Malawi, Mauritius and Seychelles); five other countries reached a coverage of at least 80%. However, many epidemic outbreaks have been reported, surveillance is too often inadequate and the containment of these epidemics insufficient.

In the face of the increasing incidence of tuberculosis, the countries of the Region have given priority to strengthening national control programmes, specifically by promoting short-course chemotherapy. Of the 34 national programmes for which information is available, 27 have a central tuberculosis control unit, 11 are providing short-course treatment for all patients, and 19 are providing it for 50% of patients. However, there has not been full compliance with treatment protocols. A number of countries are concerned by difficulties in ensuring a regular supply of anti-tuberculosis drugs.

There has been significant progress in the treatment of leprosy with multidrug therapy, the coverage of which increased from 7% in 1987 to 27% in 1990 and 63% in 1993. The use of multidrug therapy has led to a reduction in the prevalence of the disease from about 483 000 cases in 1990 to about 159 000 in 1993. These results are encouraging and promising for the achievement of the target of reducing the prevalence of leprosy to less than one case per 10 000 people by the year 2000.

The malaria control programme was given high priority in most countries at risk. Twenty-five countries have organized training for national officials, and especially district health workers, in new strategies based on the correct management of malaria. The countries put special effort into programme management: operational targets have been defined in many countries, and indicators for continuous surveillance and evaluation have been taken into account in their information systems. But some difficulties are being encountered in the implementation of certain components of the regional malaria control strategy, particularly ensuring the availability and accessibility of insecticide-impregnated materials, and maintaining surveillance of *Plasmodium falciparum* resistance to antimalarial drugs.

Two major initiatives took place in cooperation with countries: promotion of the quality of care in health care delivery facilities and services in the Region and promotion of action aimed at wider accessibility of essential drugs. A partnership for sharing expertise and cooperation in the area of health sector reform was established among 10 countries in southern Africa. A meeting was held in the United Republic of Tanzania to identify ways in which health research on such topics as user charge exemption mechanisms can support the reform process in sub-Saharan Africa.

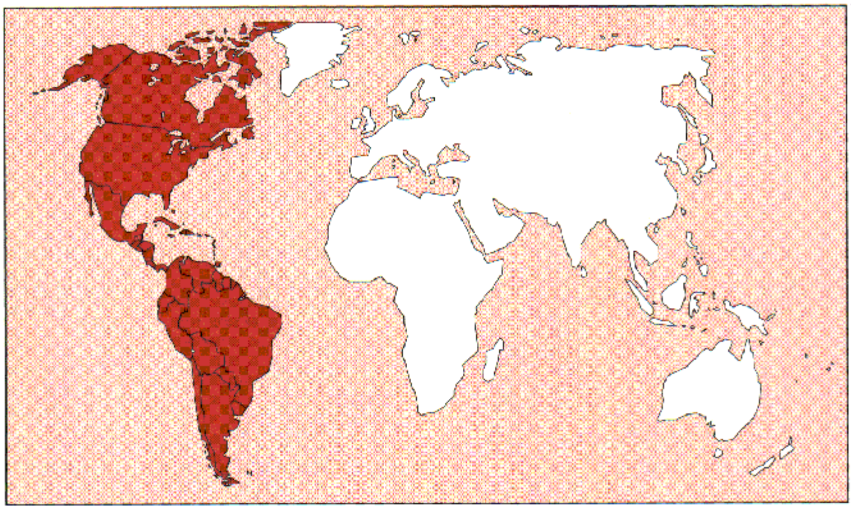
Steps are being taken to put into place a system of support to countries in order to facilitate the purchase of generic drugs and ensure the widest possible accessibility to them. This will encourage the setting-up of sustainable community cost-recovery mechanisms for the delivery of good-quality care.

A meeting in 1995 of the African network of public health training and research institutions focused on defining the concept of "the new public health" adapted to the cultural, epidemiological and socioeconomic context of the Region. The results obtained will undoubtedly have an impact on practice, training and research in public health in Africa. An inventory of centres of excellence is being drawn up with a view to increasing the number of collaborating centres.

Under the new Africa 2000 initiative for expanding water supply and sanitation services through partnership between countries, agencies and NGOs, national consultations to prepare strategies and action plans were held in 14 countries, and demonstration projects to promote new concepts of hygiene education, low-cost sanitation, and operation and maintenance were launched in 12 countries.

The Regional Office is supporting governments in coordinating in a sustained manner health inputs from multilateral, bilateral and nongovernmental organizations. Projects have been funded by other agencies such as the World Bank and the African Development Bank. Quality assurance is a major area of support, as is technology transfer to strengthen local production facilities.

Integrated disease control – especially the attainment of eradication, elimination and control targets – thus continues to be a major concern of the Region. Promotion of the quality of care and its accessibility for the most disadvantaged are among the operational priorities for the coming years. In health promotion and protection, guidelines are aimed at identifying problems and needs that can be resolved or met from available resources and at giving priority to interventions likely to produce observable results.



35 Members
1 Associate Member
Population (1995): 773 million

GNP per capita	
• Regional average (1993)	$11 341
minimum: Nicaragua	$340
maximum: United States	$24 740
• Annual average growth rate (1980–1993)	
minimum: Nicaragua	-5.7%
maximum: St Kitts and Nevis	5.4%

Antigua and Barbuda
Argentina
Bahamas
Barbados
Belize
Bolivia
Brazil
Canada
Chile
Colombia
Costa Rica
Cuba
Dominica
Dominican Republic
Ecuador
El Salvador
Grenada
Guatemala
Guyana
Haiti
Honduras
Jamaica
Mexico
Nicaragua
Panama
Paraguay
Peru
Saint Kitts and Nevis
Saint Lucia
Saint Vincent and the Grenadines
Suriname
Trinidad and Tobago
United States of America
Uruguay
Venezuela

Associate Member:
Puerto Rico

The Americas

The countries of the Region are experiencing changes in the profiles of their population and the health problems they confront. Almost all have shown declines in infant and childhood mortality and increases in life expectancy at birth, primarily as a result of the control of infectious diseases in the early years of life. As populations have aged and become concentrated in large urban areas, chronic and degenerative diseases, particularly cardiovascular disease and cancer, have become more important as causes of morbidity and mortality. The countries that have reduced early mortality the most and have achieved the lowest birth rates have the highest incidence of chronic diseases. At the other end of the spectrum are those countries that still have high infant and child mortality, primarily from diarrhoea and acute respiratory illness.

1995 marked the fourth year without poliomyelitis in the Region. The success of polio eradication in the Americas can be attributed to several factors, including high-level political commitment, dedicated community participation, social mobilization, a remarkable degree of solidarity among all the peoples of the Region, and the strong and steadfast collaboration of agencies and organizations working towards the same goal. The goal was reached by means of strategies that included mass immunization campaigns aimed at attaining coverage levels above 80%; reinforced surveillance of all cases of acute flaccid paralysis; a network of laboratories working together to analyse samples; case-finding, follow-up, and sample gathering by epidemiologists; and constant monitoring of key surveillance indicators. The "polio model" has come to be viewed as the archetype for successfully combating other disease problems.

Infectious diseases are still the major cause of morbidity and mortality in the Region, and they account for most of the demand on the health services. Moreover, the risk of new or re-emerging infectious diseases looms large. Some – such as cholera – had not been active for decades, but humbled the health services by returning to the Region. The resurgence of these diseases is due to several factors, such as human incursions into wilderness areas and, more significantly, to the deterioration of basic water and sanitation services and overcrowding in urban areas. In Ecuador, Mexico, Peru and some countries of Central America, a seasonal pattern of cholera seems to have emerged, suggesting that the infection has become endemic. In 1995, the Organization mobilized approximately $1.7 million from the international community and the Inter-American Development Bank technical cooperation agreement for investment in improved water and sanitation systems, epidemiological surveillance, proper case management, laboratory diagnosis, social communication strategies and safe food handling. All these factors, combined with exten-

	1980			*1995*			*2000*				
Selected health-for-all (HFA) indicators	*Average*	*Maximum*	*Minimum*	*Average*	*Maximum*	*Minimum*	*Average*	*Maximum*	*Minimum*	*HFA targets*	*No. of Member States which have not met the HFA targets in 1995*
Life expectancy at birth (years)	68	75	52	72	78	58	73	78	59	> 60	1
Infant mortality rate (per 1 000 live births)	50	120	10	34	82	7	31	72	6	< 50	4
Under-5 mortality rate (per 1 000 live births)	65	171	13	42	107	8	38	93	7	< 70	4

sive health education efforts, have contributed to maintaining case fatality rates under 1%.

Dengue also has become widespread in many tropical countries, and its more lethal form, dengue haemorrhagic fever, appears to have become endemic in some. Training was provided in the clinical diagnosis and treatment of dengue haemorrhagic fever (9 countries), vector control (3 countries), social participation and laboratory diagnosis. A proficiency programme for laboratory diagnosis of dengue has been carried out since 1993, involving over 25 laboratories. Efforts are being made to develop self-sufficiency in the production of dengue reagents in Central America. A technical task force was established to study the feasibility and timeliness of drawing up a hemispheric plan for the eradication of *Aedes aegypti* as an effective means of controlling dengue and urban yellow fever in the Americas.

Tuberculosis remains a serious problem in the Region – it is present in every country, despite the fact that effective drugs and a cost-effective tuberculosis control strategy exist. Controlling this disease presents a tremendous challenge especially in view of the synergistic relationship between tuberculosis and HIV infection.

The pattern of HIV transmission in the Americas is changing and the epidemic is rapidly spreading to heterosexual populations, with new infections occurring primarily among those 15 to 25 years old. In addition, HIV infection is increasingly associated with poverty and lack of access to basic health and education services. Through partnerships with the governments of Canada, France, Germany, the Nordic countries, and Spain, WHO mobilized almost $2 million for activities crucial to the prevention and control of the AIDS epidemic in the Region, and its consequences.

Morbidity and case fatality in the epidemic of plague in Peru have been significantly reduced, mainly as a result of the efficiency of coordinated action at the community level, and of technical cooperation. During 1995, a contribution of $680 000 was obtained from the European Community Humanitarian Office to strengthen prevention and control activities.

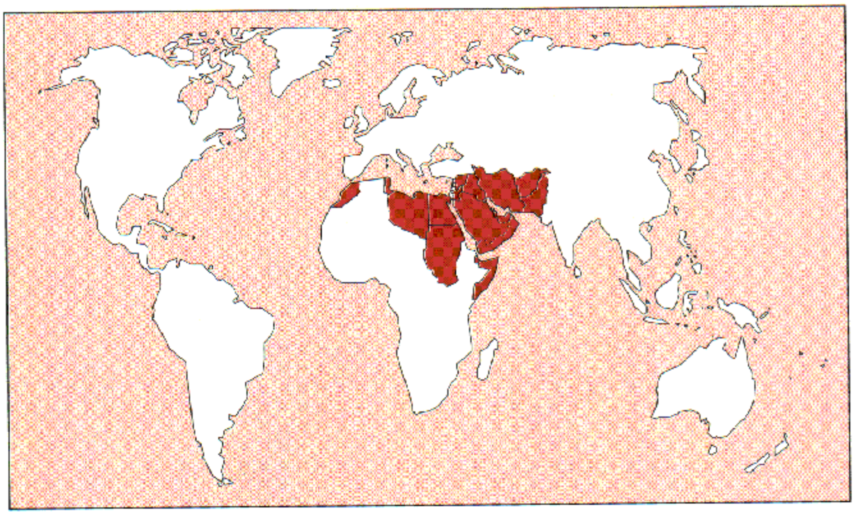
Although the greatest triumphs in the control of childhood infections have been achieved through immunization programmes, better living conditions and nutrition can be credited in part for continued improvements in traditional maternal and child health indicators. Despite these successes, nearly 350 000 children in Latin America and the Caribbean die every year before their first birthday for preventable reasons tied to poverty, a loss that roughly translates to the deaths of two children every three minutes.

Diarrhoeal diseases rank among the five leading causes of death in infants under 1 year old, and are the most frequent single cause of death among children between 1 and 4 years old in many countries of the Region. Moreover, these diseases are major determinants of growth retardation and malnutrition, helping to sustain the cycle of disease. Diarrhoeal diseases are thus one of the health problems that most affect children in the Americas.

Largely as a result of the pressures exerted to restructure their debt in the late 1980s, the vast majority of the countries of the Region engaged in reform processes that included the health sector. Well over half of them report some reform efforts, including the development of national health plans, decentralization, enhancing the delivery of services at the local level, and generally, efforts aimed at improving the accessibility, coverage and efficiency of the health services. In order for decentralization to be successful, the health services at the provincial and municipal levels must have adequately trained staff who can carry out the critical technical and managerial tasks to ensure efficient service delivery.

Poverty, as an expression of social inequity, is the underlying cause of most of the morbidity and mortality in the Region. The restrictions placed on public spending during the 1980s have curtailed social investments, with dire consequences for the already disadvantaged. Although the vast inequality in income distribution registered during the past decade was mitigated or reversed in some countries in the early 1990s, poverty levels in most countries are still higher than they were in the 1970s.

Throughout the 1990s, there has been a growing understanding of the interdependence of the factors that contribute to human well-being and of the power of integrated approaches to improve the health status of the population. Member States of the Region increasingly acknowledge that the health sector's boundaries must stretch if countries are to effectively address conditions such as poverty, inequality, marginalization, and gender-based discrimination, which lead to gross inequities in health and health care.



Eastern Mediterranean

22 Members
Population (1995): 454 million

GNP per capita

• Regional average (1993)	$1 029
minimum: Somalia	$170
maximum: United Arab Emirates	$21 430
• Annual average growth rate (1980–1993)	
minimum: Qatar	-7.2%
maximum: Cyprus	4.9%

Afghanistan
Bahrain
Cyprus
Djibouti
Egypt
Iran (Islamic Republic of)
Iraq
Jordan
Kuwait
Lebanon
Libyan Arab Jamahiriya
Morocco
Oman
Pakistan
Qatar
Saudi Arabia
Somalia
Sudan
Syrian Arab Republic
Tunisia
United Arab Emirates
Yemen

Despite some favourable changes in the political situation in the Region (such as the settling of the problem in Lebanon and the evolution of a unified Yemen), there were also significant setbacks. Repercussions of the 1990-1991 Gulf War still affect a number of countries, due to massive population movements, huge expenditures and a drop in revenues. In war-affected areas, lack of funds, food, drugs and other supplies, of security and the concomitant difficulties in implementing health programmes, all add to the suffering of people.

Emerging diseases have been a focus of many activities in the Region. In view of the spread of viral hepatitis, brucellosis, leishmaniasis and haemorrhagic fevers, and other examples of resurgences (such as tuberculosis), a regional conference was held in November 1995 to build up regional and national control efforts. The conference endorsed a regional plan emphasizing various elements of surveillance and response to the emergence and resurgence of communicable diseases. Particular attention was paid to viral hepatitis, especially type C which has very high prevalence rates in some countries. The first in a series of regional workshops for training of trainers in communicable disease surveillance and epidemic preparedness and response was held.

Efforts to eradicate poliomyelitis are progressing well in most Member States with 11 countries reporting zero cases, although there are problem areas in countries suffering from civil strife. The number of cases decreased significantly during 1994 and the first part of 1995. National immunization days were implemented in 19 countries during 1995. Laboratory-based surveillance has improved, and during 1994, 74% of reported cases of acute flaccid paralysis were investigated in laboratories. National committees for certification of poliomyelitis eradication have been established in many countries, and the regional commission on poliomyelitis eradication held its first meeting in September 1995.

Concern continues in the Region about the deteriorating malaria situation in Afghanistan, Djibouti, Somalia and Sudan. Efforts are being made to support these countries and to maintain control of the malaria epidemic in northern Iraq. WHO collaborated with national authorities to reorient national programmes and bring them into line with the global strategy for malaria control, particularly in relation to making judicious use of insecticides, developing a system for monitoring drug sensitivity, enhancing epidemic preparedness, and achieving self-sufficiency in the supply of drugs and insecticides and impregnated materials through promotion of local production. Progress was made in maintaining the malaria-free status in eight countries, and ensuring the non-proliferation or reduction of residual foci in two more. WHO also collaborates in ensuring that there is no shortage of

	1980			*1995*			*2000*				
Selected health-for-all (HFA) indicators	*Average*	*Maximum*	*Minimum*	*Average*	*Maximum*	*Minimum*	*Average*	*Maximum*	*Minimum*	*HFA targets*	*No. of Member States which have not met the HFA targets in 1995*
Life expectancy at birth (years)	55	74	40	63	77	44	65	78	46	> 60	5
Infant mortality rate (per 1 000 live births)	113	183	18	71	159	8	62	150	7	< 50	10
Under-5 mortality rate (per 1 000 live births)	160	280	21	98	251	9	86	228	7	< 70	9

drugs. Local production of chloroquine was started in Sudan with WHO support. Two training centres for malaria started functioning in 1995 in Sudan and the Islamic Republic of Iran. WHO supported local production of impregnated bednets which have proved to be effective in eliminating disease vectors, and local manufacture of antimalarial drugs through securing for countries the raw materials needed.

Eradication of dracunculiasis was successful in Pakistan. No cases have been reported since October 1993. In Sudan and Yemen the disease still exists, but eradication efforts were much improved. Surveillance activities and control measures are being boosted in close collaboration with all agencies concerned.

National leprosy control programmes were updated and supported by the provision of drugs and teaching/learning materials. Member States of the Region reaffirmed their commitment to achieving the target of the elimination of leprosy as a public health problem by the year 2000.

Plans and strategies for health and the environment were prepared or are under way in 17 countries of the Region, and the concept of healthy cities and healthy villages was accepted and promoted in various countries with WHO support. Several international funding agencies such as UNICEF have made health promotion an integral part of their support to a new health strategy. A major activity in the Eastern Mediterranean was a meeting on health promotion for supportive environments with special focus on healthy cities, held in Bahrain in September 1995.

During its 10 years of existence, the Centre for Environmental Health Activities (CEHA) has proved to be a viable addition to the Region's environmental health programme, serving as its technical arm and information exchange unit. In addition to supporting health, CEHA's Regional Environmental Health Information Network (CEHANET) continues to expand its information services to Member States, and to strengthen their national networking capabilities, drawing up plans according to the priority needs of Member States and implementing them in close collaboration with concerned national and international organizations.

Human resources development is at the core of implementation of national programmes. A WHO manual on human resources policy analysis was prepared and tested in three countries. The use of national languages, particularly Arabic, in medical and paramedical education is accorded priority, and WHO has supported the preparation of textbooks in these languages for use by training institutions. The Regional Office extended technical support to national authorities in their efforts to increase the number of nursing training institutions, and in reviewing and updating curricula and developing clinical nursing modules and practice.

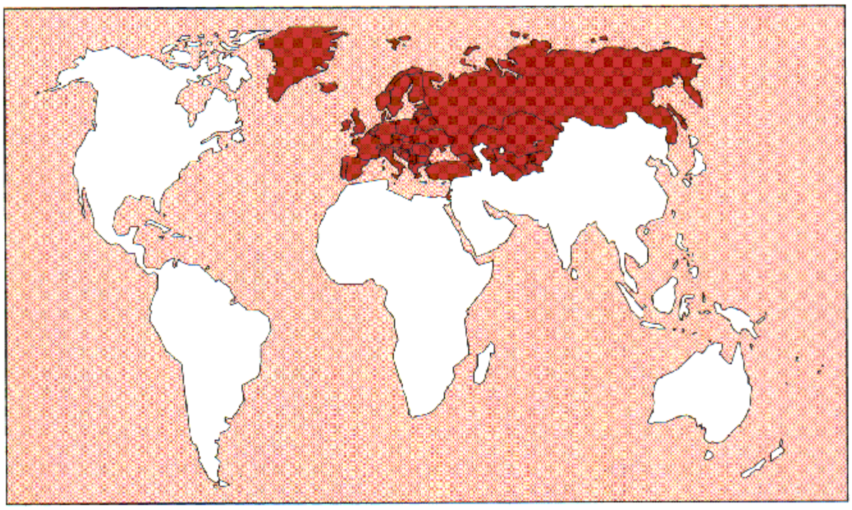
Several Eastern Mediterranean countries are attempting to restructure their health care financing systems. A regional programme on health care economics and financing has been established together with a computerized regional health database to support health management. Egypt, Pakistan and Yemen have addressed the problem of health sector reform in a pragmatic manner, setting up special accounts for the development and support of national regulatory authorities.

The basic minimum needs/quality of life concept has expanded among and within countries of the Region. At present, 12 countries have embarked on basic minimum needs (BMN) programmes, albeit at different rates.

Projects to extend health laboratory services in support of primary health care were completed in many countries of the Region. To upgrade quality assurance, follow-up continued at regional and country levels in line with national and regional plans formulated in previous years, with emphasis on laboratory management. The Regional Office has issued several manuals on blood transfusion, which are being used by countries to ensure the provision of safe blood and blood products.

National lists of essential drugs were adopted by many countries. Local drug production was encouraged and the Region initiated a programme for providing raw materials for local manufacture of drugs, instead of importing finished products (e.g. production of chloroquine tablets in Sudan, already mentioned).

Countries of the Region believe that it is time to recall that ethical values in medical practice need to be reinforced in today's world where mostly technical and economic considerations prevail. There is already an impetus in the Region to develop a code of health ethics, and interested parties from other areas of the world will be encouraged to participate in its formulation.



50 Members
Population (1995): 855 million

GNP per capita	
• Regional average (1993)	$10 425
minimum: Albania	$340
maximum: Luxembourg	$37 320
• Annual average growth rate (1980–1993)	
minimum: Georgia	-6.6%
maximum: Ireland	3.6%

Albania
Armenia
Austria
Azerbaijan
Belarus
Belgium
Bosnia and Herzegovina
Bulgaria
Croatia
Czech Republic
Denmark
Estonia
Finland
France
Georgia
Germany
Greece
Hungary
Iceland
Ireland
Israel
Italy
Kazakhstan
Kyrgyzstan
Latvia
Lithuania
Luxembourg
Malta
Monaco
Netherlands
Norway
Poland
Portugal
Republic of Moldova
Romania
Russian Federation
San Marino
Slovakia
Slovenia
Spain
Sweden
Switzerland
Tajikistan
The Former Yugoslav Republic of Macedonia
Turkey
Turkmenistan
Ukraine
United Kingdom of Great Britain and Northern Ireland
Uzbekistan
Yugoslavia

Europe

A wave of change has broken over the European Region during the past few years, transforming the social, political and economic landscape. The most important feature of this landscape for health is the deep and widening gap between the eastern and western parts of the Region. Nevertheless, WHO's recent work shows that the regional policy for health for all, with its 38 targets, offers the best way to meet the health challenges of both the old Europe and the new.

The policy's enduring value lies in its comprehensive approach to health, its firm fundamental principles, and the flexibility of their application. This means that the Regional Office pursues a wide variety of goals in all areas relevant to health – including disease prevention, lifestyles, the environment and health services – with any combination of methods and partners that suits the circumstances.

In order to meet the challenge of the growing gap in health status between east and west, the Regional Office, through the EUROHEALTH programme, now directs two-thirds of its resources to the countries of central and eastern Europe and the newly independent States. The EUROHEALTH programme with its six priority areas (health policies; health care reform; women's and children's health; infectious diseases; noncommunicable diseases; the promotion of better health; and environmental health) is seen as the major tool for focusing support to those countries in the Region in greatest need.

The Region is experiencing an alarming resurgence of infectious diseases. Epidemics of diphtheria and poliomyelitis constitute a major health threat, mainly in the newly independent States. A diphtheria epidemic (which originated in the Russian Federation and Ukraine in the early 1990s) rose sharply to 50 000 cases and was present in all those States by 1995, affecting both adults and children. A review of the status of the epidemic in 1994 made it clear that a hitherto unexpected level of help was needed if it was to be brought under control. By virtue of the Kyoto Declaration of 1994 a consortium was created to support immunization programmes in the newly independent States. By acting as the main technical coordinator and secretariat for the consortium partners (UNICEF, Rotary International, the International Federation of Red Cross and Red Crescent Societies, the Government of Japan, the Government of the United States of America, the European Union and others) the Regional Office has been instrumental in launching a consolidated response.

Together with the Eastern Mediterranean Region, a huge campaign was launched (operation MECACAR) to provide simultaneous poliomyelitis vaccination in 18 countries of the two Regions. Two rounds of vaccination have been completed, with highly satisfactory results as regards both coverage and im-

	1980			1995			2000				
Selected health-for-all (HFA) indicators	*Average*	*Maximum*	*Minimum*	*Average*	*Maximum*	*Minimum*	*Average*	*Maximum*	*Minimum*	*HFA targets*	*No. of Member States which have not met the HFA targets in 1995*
Life expectancy at birth (years)	71	77	61	73	79	66	73	79	68	> 60	0
Infant mortality rate (per 1 000 live births)	33	111	7	22	58	5	19	48	5	< 50	2
Under-5 mortality rate (per 1 000 live births)	36	119	9	26	68	4	24	60	4	< 70	0

pact on transmission. This major collaborative effort during the previous 12 months was related to the goal of poliomyelitis eradication and was carried out with UNICEF, Rotary International, the United States Agency for International Development and the United States Centers for Disease Control and Prevention, as major partners.

The political and economic transformation of the countries of central and eastern Europe and of the newly independent States contributed to the gap in health status. While these countries are searching for new ways to manage and finance their health care systems in order to provide better care, the health care services are hit by inflation, recession, high unemployment and scarcity of vital materials. All these concomitant aspects have increased the pressure for rapid large-scale changes.

It is hoped that the WHO ministerial conference on health care reform to be held in Ljubljana in 1996 will mobilize the political will and awareness required for supporting changes in Europe in general and the newly independent States in particular. Information exchange on aspects of health care reform is taking place through the central Asian republics' network on health care financing and management (CARNET) and MIDNET, which serves the same purpose for the countries of central and eastern Europe. The Regional Office continues its cooperation with Kyrgyzstan and Turkmenistan, which aims at designing national plans for health care reform and at empowering the national authorities to carry them out.

The Second European Conference on Environment and Health (Helsinki, 1994) turned out to be a major stimulus for development. One of its outcomes was the establishment of a permanent mechanism for cooperation in environment and health in Europe between all major organizations dealing with this issue – the European Environment and Health Committee – which met for the first time in March 1995.

Another outcome of the Conference was the commitment that ministers of health and ministers of the environment would jointly produce national environmental health action plans. This work is now under way in six countries, and has already resulted in closer cooperation between the two sectors.

Although the conflict in the countries of the former Yugoslavia has ceased, it has not been possible to scale down, much less abandon the Regional Office's large-scale operations in this area. Donor support has steadily improved, which has facilitated better long-term planning from which the operations in Bosnia and Herzegovina have greatly benefited. Limited assistance has also been given to Tajikistan and the Caucasus countries.

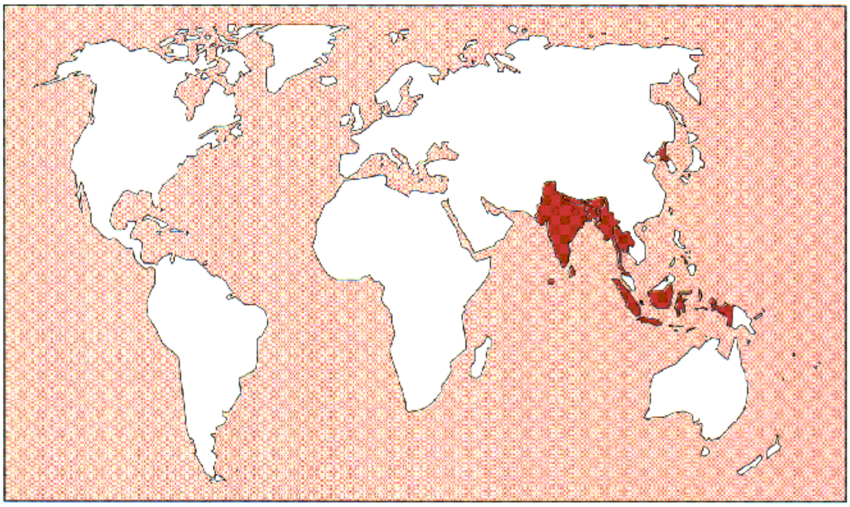
Reviews of the Regional Office's work in the countries of the former Yugoslavia have led to a number of pragmatic managerial and administrative reforms regarding the manner in which the field operations are carried out. However, as a global task force has been established to look at the administrative aspects of WHO's humanitarian assistance programme at global, regional and country levels, the Regional Office will await completion of this work before drawing up detailed regional guidelines.

The Regional Office has been widening its network of international partners, including United Nations bodies, the European Union, governments and their agencies, and hundreds of nongovernmental organizations.

In 1995, a particular effort was made to strengthen partnership with the World Bank. In addition to the Bank's participation in the European Environment and Health Committee, it also takes part in a health care reform project in Kyrgyzstan, and will fund a public health advisory project in Hungary. Plans are in the making for cooperation in Bulgaria, Poland, Romania and the Former Yugoslav Republic of Macedonia.

As regards cooperation with the Commission and the Council of Europe, the project on "health-promoting schools" continued and expanded during the past 12 months to more than 450 schools in 34 countries; in addition, 2 000 schools are linked to the project through national and subnational arrangements. Cooperation with the Commission was particularly close in the field of information, where the Regional Office produced for the Commission a special review of the health status in 12 European countries, was contracted to produce "country highlights" for each of the European Union Member states, and is assisting the Commission in demonstrating the feasibility of electronic exchange of information on communicable diseases and vital statistics among the "G-7" countries.

Cooperation with UNICEF increased considerably through the MECACAR poliomyelitis project, the diphtheria project, the joint support for vaccination in newly independent States, the maternal and child health project for central Asian republics, and cooperation in humanitarian assistance projects.



10 Members
Population (1995): 1.4 billion

GNP per capita

• Regional average (1993)	$440
minimum: Nepal	$190
maximum: Thailand	$2 110

• Annual average growth rate (1980–1993)	
minimum: Nepal	2%
maximum: Maldives	7.2%

Bangladesh
Bhutan
Democratic People's Republic of Korea
India
Indonesia
Maldives
Myanmar
Nepal
Sri Lanka
Thailand

South-East Asia

South-East Asia is a populous and heterogeneous Region, with complex and varied socioeconomic conditions. Most countries depend on agriculture but are increasingly turning to industrialization. Illiteracy, poverty and malnutrition are widespread. Although adult literacy rates in general have improved over the last few decades, female literacy is still below 40% in some countries. During 1995 alone, natural disasters cost hundreds of lives and caused economic losses estimated at more than $20 billion.

The main change in the morbidity and mortality pattern during the last ten years is due to a decline of polio, neonatal tetanus and other vaccine-preventable diseases, as well as to the declining incidence and prevalence of leprosy. In respect of diarrhoeal diseases and acute respiratory infections, increased access to oral rehydration therapy and standardized case management of childhood diseases at health facilities have led to declines in mortality, albeit to a lesser extent.

The successes of the Expanded Programme on Immunization are relatively easy to quantify. Since the beginning of the programme, the immunization rate for all children in the Region has been maintained at 80% or above, while immunization coverage of tetanus toxoid among pregnant women was estimated to be 77%, the highest of all WHO regions. Between 1988 and 1994 reported cases have declined substantially for polio (83%), neonatal tetanus (80%), diphtheria (77%) and pertussis (77%). In 1994, South-East Asia accounted for more than 60% of the worldwide reported cases of polio, and the responses of the Region's countries have been remarkable, with national immunization days conducted in Bangladesh, Bhutan, India, Indonesia, Sri Lanka and Thailand in 1994–1995.

The number of reported cases of dracunculiasis in India has fallen to 59 in 1995 from a total of 371 in 1994; during the last two years the incidence of visceral leishmaniasis has also declined. If the prevention and control programmes for dracunculiasis and leishmaniasis are intensified, there is a real chance that they may be eradicated or brought to very low levels of incidence during the next few years.

The less optimistic side of the regional health situation is caused by the high incidence and prevalence of acute respiratory infections, diarrhoeal diseases, malnutrition and nutritional deficiency disorders, vector-borne diseases (especially malaria) and tuberculosis. Despite an overall decline in the prevalence of nutritional anaemia, a survey conducted in six countries of the Region indicates that more than 50% of women of childbearing age continue to be af-

	1980			*1995*			*2000*				
Selected health-for-all (HFA) indicators	*Average*	*Maximum*	*Minimum*	*Average*	*Maximum*	*Minimum*	*Average*	*Maximum*	*Minimum*	*HFA targets*	*No. of Member States which have not met the HFA targets in 1995*
Life expectancy at birth (years)	54	68	44	62	72	52	64	74	54	> 60	4
Infant mortality rate (per 1 000 live births)	113	160	31	75	115	16	66	99	14	< 50	7
Under-5 mortality rate (per 1 000 live births)	153	219	38	99	149	20	85	130	17	< 70	6

fected. Challenges for the future are the persistence of malaria and tuberculosis; the resurgence of plague; the emergence of chronic noncommunicable diseases such as cardiovascular diseases, cancer and diabetes; the emergence of other infectious diseases such as dengue haemorrhagic fever, Japanese encephalitis and cholera (El Tor); and the HIV/AIDS pandemic.

As part of the global malaria control strategy, WHO initiated a regional collaborative programme in South-East Asia on drug-resistant malaria in border areas. A border meeting on malaria and visceral leishmaniasis, with participants from Bangladesh, Bhutan, India and Nepal, drew up a joint action plan to solve the common problems posed by these diseases. Similar border collaboration is being set up between Thailand and neighbouring countries. WHO provided technical assistance and logistics support for control measures in parts of India and Bangladesh affected by floods and epidemics of malaria.

Dengue/dengue haemorrhagic fever is an important emerging health problem in the Region. A significant achievement has been the development of a live attenuated tetravalent vaccine in Thailand. The vaccine has been found to be safe and immunogenic among adults and trials in children are proceeding. This is the first vaccine originating from a developing country.

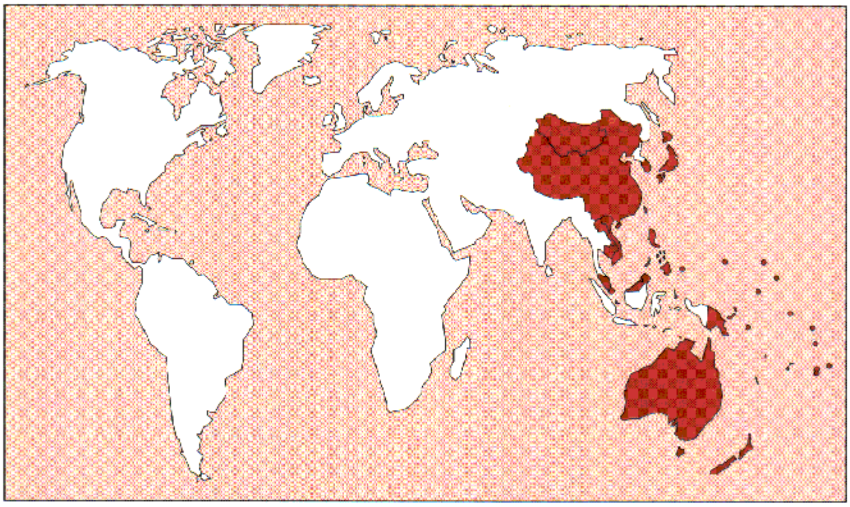
Though HIV/AIDS is becoming a serious problem, there have been a few notable successes in some countries. The 100% condom use programme in Thailand resulted in a reduction in the incidence of sexually transmitted diseases from 6.5 per 1 000 population in 1989 to 2.1 in 1992, the lowest incidence recorded during the last 20 years. HIV infection rates among young adults such as military recruits are now declining. Following a peer education programme among sex workers in Calcutta (India) which started in 1992, the use of condoms increased from 1% in 1992 to 42% in 1993, resulting in a sharp decline in the prevalence of sexually transmitted diseases.

Leprosy is an important public health problem in South-East Asia, accounting for 70% of the global registered cases. The nine endemic countries are implementing national plans for the elimination of leprosy as a public health problem by the year 2000, based on expansion of multidrug therapy within the framework of primary health care.

The epidemiological transition (the changing pattern of mortality and morbidity in association with demographic changes) is in its early stage in Bangladesh, Bhutan, most Indian states, Maldives, Myanmar and Nepal. It is more advanced in the Democratic People's Republic of Korea, Sri Lanka, Thailand and to some extent Indonesia, where the infective component is gradually being replaced by noninfective and noncommunicable conditions such as cardiovascular diseases, cancer, congenital anomalies, endocrine disorders and accidents.

The quality and quantity of human resources for health need improvement in most countries of the Region. In some countries there are shortages of most categories of health personnel, while in others there are either sufficient or excessive numbers of doctors, but shortages in other categories. There is a general need to improve the distribution of health personnel, which at present is usually uneven, mostly with excesses in urban areas and shortages at the periphery. The quality of essential (basic) health personnel at the lower levels is especially uneven, both between and within countries, and needs urgent attention.

Forecasts for the next five to ten years envisage morbidity and mortality burdens still dominated primarily by infectious diseases, with the beginning of a shift towards noncommunicable chronic diseases in Bangladesh, Bhutan, most of the states of India, Maldives, Myanmar and Nepal. Cardiovascular diseases, cancer, diabetes, other noncommunicable diseases and accidents will affect to a greater extent the more advanced countries of the Region which have achieved higher levels of life expectancy. The HIV/AIDS epidemic will be present throughout the Region. It may peak in India, Myanmar and Thailand, with potential to spread rapidly in most other countries.



27 Members
1 Associate Member
Population (1995): 1.6 billion

GNP per capita

- Regional average (1993) $3 462
  minimum: Viet Nam $170
  maximum: Japan $31 490
- Annual average growth rate (1980–1993)
  minimum: Philippines -0.6%
  maximum: China, Republic of Korea 8.2%

Australia
Brunei Darussalam
Cambodia
China
Cook Islands
Fiji
Japan
Kiribati
Lao People's Democratic Republic
Malaysia
Marshall Islands
Micronesia (Federated States of)
Mongolia
Nauru
New Zealand
Niue
Palau
Papua New Guinea
Philippines
Republic of Korea
Samoa
Singapore
Solomon Islands
Tonga
Tuvalu
Vanuatu
Viet Nam

Associate Member:
Tokelau

Western Pacific

Member States of the Western Pacific Region have responded to the call for global change by adopting he Regional Office's *New horizons in health* as the principal instrument for change. Its concepts and approaches form part of policy-making and activity implementation throughout the Region, both at country level and among groups of countries. The approaches have been the subject of commitment at the highest political levels, as in the Ministerial Conference on Health for the Pacific Islands in March 1995, and they have been implemented at functional management levels. The concept of "healthy islands" forms a framework for implementation of this initiative in the Pacific. The Plan of Action for Intensified Malaria Control (1995-1996) being implemented in the Solomon Islands demonstrates at country level the type of active multisectoral response envisaged. The Health Development Plan until the Year 2000 in the Lao People's Democratic Republic and the Seventh Malaysia Plan have also incorporated significant elements of *New horizons in health*. It should be noted that Mongolia joined the Western Pacific Region in June 1995.

The Regional Office has not only been responsive to well-recognized problems, but also well prepared to react quickly to resurgences of disease, or newly emerging problems, such as requests for cooperation in cholera control or emergency requests related to other urgent disease outbreaks or crisis situations. In 1995, an epidemic of dengue haemorrhagic fever was reported in Cambodia. Responding to a call from the First Prime Minister, WHO set up an emergency dengue control team which moved quickly to work with the national control programme. The Government launched an integrated intervention campaign, with information dissemination, insecticide spraying, and larvicide distribution, supported by WHO, UNICEF and NGOs.

WHO made a rapid response to a recent outbreak of diphtheria in Mongolia, with the supply of vaccine. The Regional Task Force on Cholera Control also has demonstrated the value of a multidisciplinary approach to prevention and timely response to outbreaks.

When intensified efforts to eradicate poliomyelitis began in 1990, there were nearly 6 000 reported cases of poliomyelitis in the Region. In 1996, the Region is practically polio-free. Provisionally as at March 1996, only 13 indigenous wild poliovirus associated cases were reported in 1995, in the Mekong Delta region of Cambodia and Viet Nam, and one imported case in Yunnan, China. The wild poliovirus should be completely eradicated from the Region within the next two years. The Regional Certification Commission will hold its first meeting in 1996, and the Region

	1980			*1995*			*2000*				
Selected health-for-all (HFA) indicators	*Average*	*Maximum*	*Minimum*	*Average*	*Maximum*	*Minimum*	*Average*	*Maximum*	*Minimum*	*HFA targets*	*No. of Member States which have not met the HFA targets in 1995*
Life expectancy at birth (years)	66	76	39	70	80	52	71	80	55	> 60	4
Infant mortality rate (per 1 000 live births)	51	212	7	39	109	4	33	96	4	< 50	8
Under-5 mortality rate (per 1 000 live births)	59	301	8	45	148	6	38	127	6	< 70	6

will enter the next stage leading to the eventual global certification of poliomyelitis eradication.

The main control strategy for malaria in the Western Pacific is early case detection and treatment, combined with the use of pyrethroid-treated mosquito nets. Rotary International, with support from over 100 clubs from 15 districts, the majority in Australia and New Zealand, is closely involved with the national efforts in Vanuatu, supporting the effective distribution of impregnated mosquito nets. A new, short-term intensified plan of action is under way in the Solomon Islands, as part of the national antimalaria plan of operation for 1994-1998. The short-term plan combines environmental measures such as opening up of river mouths and drainage, with health promotion in schools, and improvements in solid waste management, water supply and sanitation.

WHO's interventions are country-sensitive and issue-specific, as in the case of leprosy. The prevalence rate per 10 000 population for the Region fell from 1.7 to 0.25 between 1986 and 1994. Although technically this means that the Region as a whole has already reached the elimination target of a prevalence less than 1 case per 10 000, the reality is that there are still countries, and areas within countries, with high endemicity, which the average figure does not reflect. WHO's challenge has been to identify why these areas of high endemicity still remain, and to implement activities which will improve the situation. This is being done through "special action projects for the elimination of leprosy", in Yunnan province in China, and two high plateau provinces in Viet Nam.

The regional strategy on health and environment focuses on urban health development/healthy cities and healthy islands and the integration of health-and-environment aspects in decision-making for sustainable development.

With regard to health systems reform, a regional policy meeting in New Zealand recommended active exchange of information on reform measures between countries. Pacific island countries have discussed common approaches to financing their health services, and insurance schemes and decentralization of services have been reviewed in Cambodia, China, Lao People's Democratic Republic, Philippines and Viet Nam.

Professional and academic organizations throughout the Region, such as medical schools and professional associations, have worked with each other and with WHO in the development of human resources for health. Postgraduate programmes specifically suited to Pacific island countries and areas have been developed, as advocated by the Yanuca Island Declaration. In Cambodia, Lao People's Democratic Republic, Malaysia, Mongolia, Viet Nam, and Pacific island countries and areas, common approaches are being taken towards health workforce planning.

High maternal mortality ratios persist in Cambodia, the Lao People's Democratic Republic, Papua New Guinea and Tuvalu, where ratios are still higher than the regional target of 300 per 100 000 live births. However, the Regional Office is considering changing the target to 100 per 100 000 live births, in which case Mongolia, the Philippines, Solomon Islands, Vanuatu and Viet Nam can also be considered as target countries for intensified action on maternal health issues. The infant mortality rate, similarly, is above the regional target of 50 per 1 000 live births in eight countries. Although infant mortality is below this level in all other countries of the Region, concerted action with WHO's partners in this field, such as UNFPA, is vital.

Noncommunicable diseases (e.g. myocardial infarction, stroke, diabetes mellitus and cancer) are among the major causes of morbidity in most countries of the Region. They consume large amounts of the limited funds available, and therefore WHO participation and support are required in preventive and curative activities at country level. Concern is growing over the rapidly aging population and related health needs, especially in terms of the cost associated with the management of chronic illnesses, rehabilitation services and palliative care.

Considerable success has been achieved in many ventures undertaken in the Region. Apart from significant progress towards the goal of eradication of poliomyelitis, and major gains in limiting tobacco advertising, Member States are committed to the goals of eliminating leprosy, and controlling malaria and tuberculosis. It is essential to consolidate the gains already achieved in making the Region a safer place to live, safe from infectious diseases. The challenges now faced and the opportunities available to achieve positive results for health are increasing.

Chapter 3

Charting the future

Disease trends

Some infectious diseases once believed to be all but conquered have returned with a vengeance. Others have developed stubborn resistance to antibiotic drugs. New or previously unknown diseases continue to emerge. Together, these trends amount to a world crisis for today, and a global challenge for the future.

They are occurring in an increasingly greying and rapidly urbanizing world. While the proportion of the population under 15 years is declining, the proportion over 70 years is increasing (*Fig 7*). The annual birth rate is on a downward trend, as is the percentage of children under 5 years of age. By 2025, many more people globally will live in urban rather than rural areas (*Fig.* 8). Urbanization in developing countries tends to lead to the growth of "megacities" with overcrowded and underserved slums, an environment that favours the increasing incidence of infectious diseases.

It is being increasingly recognized that many chronic diseases previously considered non-infectious are associated with infection. Pockets of poverty exist in all parts of the world and have become potential breeding grounds for many infectious diseases. Mass movements of population within and between countries are increasing rapidly, raising fears that potentially explosive outbreaks may occur and that diseases may

Table 6. Selected foodborne infectious diseases

Diseases/infections	Important reservoir/carrier	Transmission				Examples of some incriminated foods
		Person to person	Water-borne	Food-borne	Multiplication in food	
Ascariasis	Man	–	+	+	–	Soil-contaminated food
Brucellosis	Cattle, goats,sheep	–	–	+	+	Raw milk, dairy products
Cholera	Man, marine life	+/–	+	+	+	Salad, shellfish
E. coli infections	Man, cattle, poultry, sheep	+ [a]	+	+	+	Salad, raw vegetables, milk, cheese, undercooked meat
Giardiasis	Man, animals	+	+	+/–	–	Vegetables, fruit
Hepatitis A, viral	Man	+	+	+	–	Shellfish, raw fruit and vegetables
Listeriosis	Environment	– [b]	+	+	+	Cheese, raw milk, coleslaw, meat products
Salmonellosis (other than typhoid)	Man, animals	+/–	+/–	+	+	Meat, poultry, eggs, dairy products, chocolate
Shigellosis	Man	+	+	+	+	Potato/egg salads
Trematode infections	Freshwater fish and crabs, cattle, goats	–	– [c]	+	–	Undercooked/raw fish and crabs, watercress
Trichuriasis	Man	–	0	+	–	Soil-contaminated food
Typhoid and paratyphoid	Man	+/–	+	+	+	Dairy products, meat products, shellfish, vegetable salads

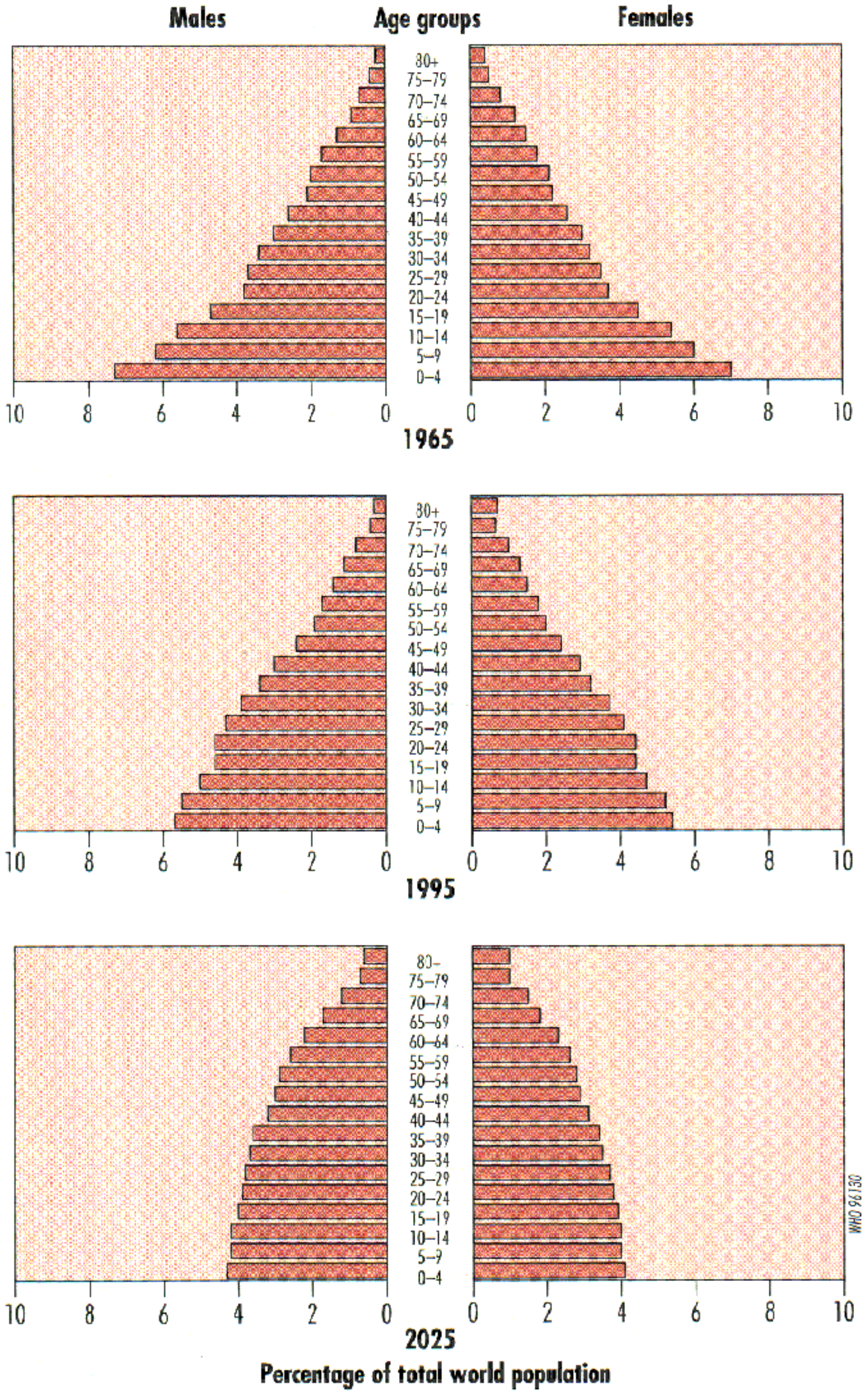
+ = Yes; +/– = Rare; – = No; 0 = No information.

a No information for infections due to enteroinvasive *E. coli.*

b Transmission from pregnant woman to fetus(es) occurs frequently.

c +/– for foodborne trematode infections due to *Fasciola hepatica.*

Fig. 7. World population by age and sex, 1965–2025



become established in new areas. Epidemics have been occurring repeatedly in several countries, reflecting fundamental deficiencies in environmental, infrastructural and behavioural patterns.

Of all infectious diseases, many can be controlled and even eliminated or eradicated, given existing advances in medical knowledge and public health practices. For example, cost-effective *immunization* strategies have protected most children in the world against diseases such as polio, measles, tetanus, pertussis and diphtheria. The incidence of many other diseases such as cholera, typhoid, dysentery, giardiasis and worm infections such as ascariasis and trichuriasis can be reduced dramatically by *personal hygiene, public health and sanitation practices* such as treating and protecting drinking-water from human and other wastes. Proper storage, cleaning and safe preparation of foods can reduce cases of bacterial food poisoning. Correct application of food processing, including fermentation and preservation, can contribute to preventing some of the foodborne diseases (*Table 6*).

With the application of new scientific knowledge and proper *use of antimicrobial drugs*, a number of diseases such as tuberculosis, malaria, schistosomiasis and filariasis can be controlled. *Vector control* methods such as spraying of chemical pesticides, the application of biological control agents, the destruction and treatment of larval development sites and personal protection measures such as applying repellents or sleeping under insecticide-treated bednets can help control malaria, yellow fever, dengue, leishmaniasis and other diseases by interrupting transmission. Effective application of these measures in cost-effective and sustainable programmes can rapidly reduce the current levels of morbidity and mortality from infectious diseases and make substantial contributions to social and economic development.

But the rapid expansion of scientific knowledge and the successful control of infectious diseases in most industrialized countries during the past few decades encouraged the widespread belief that infectious diseases were no longer a threat. Such complacency led to decreased levels of support and to dangerously inadequate systems of disease surveillance and disease prevention and control.

Simultaneously, infectious microbes have demonstrated their remarkable ability to evolve, adapt and develop resistance to drugs. As a consequence of widespread misuse of antimicrobial drugs, many countries face the emergence of drug-resistant pathogens, resulting in prolonged illness, higher mortality rates and higher health care costs. These affect in particular the elderly living in hospitals and nursing homes, the poor, the homeless, migrants, farm workers and others with inadequate access to health care.

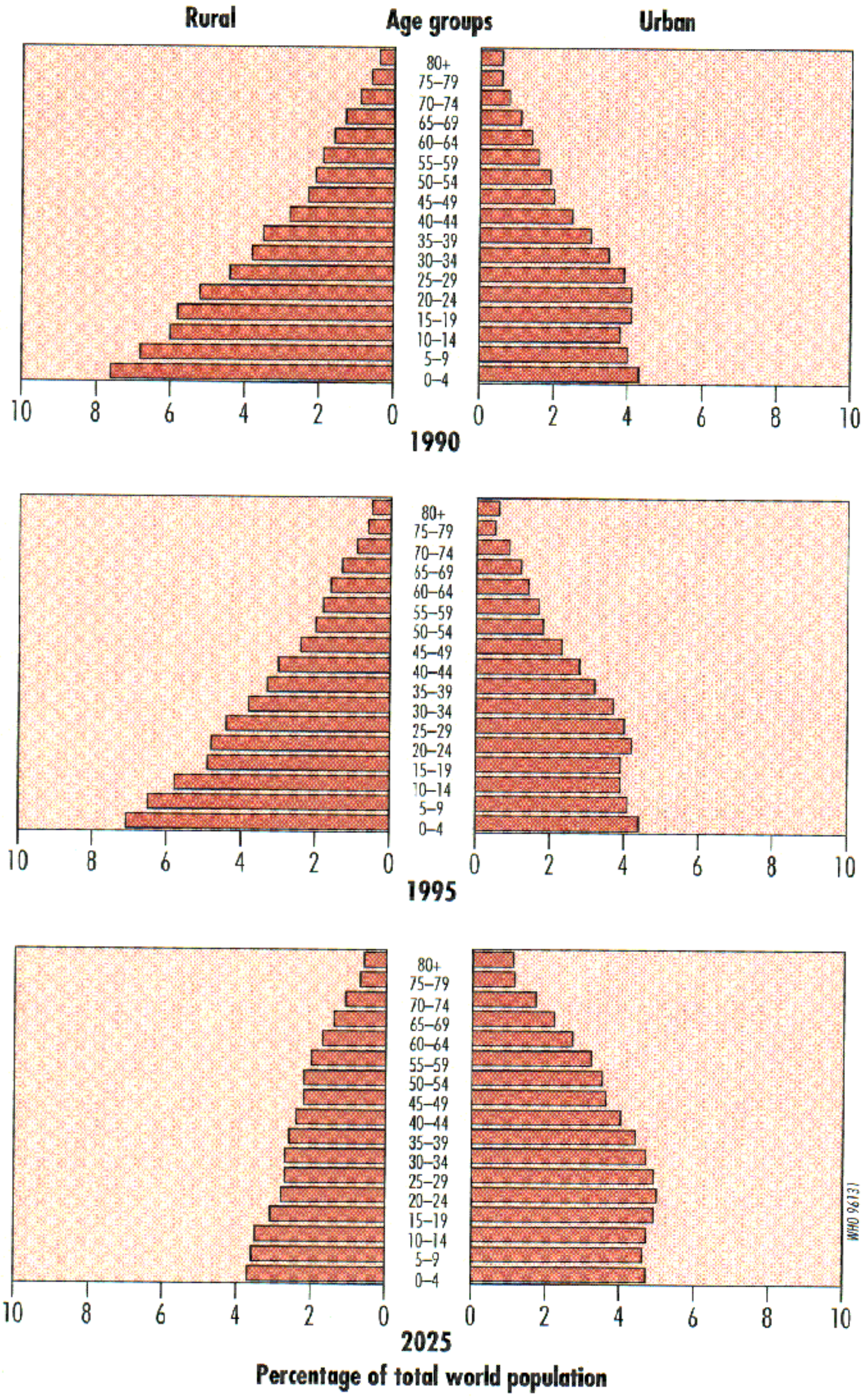
More than half of the total production of antimicrobials worldwide is currently used in farm animals, with a large proportion of antibiotics being administered in subtherapeutic doses, not to treat disease but to promote growth. This practice is contributing to the development of multiresistant strains of bacteria such as salmonellae and *E.coli* in animal production that get transferred to humans through meat or other food of animal origin or through direct contact. The prevalence and implications of antimicrobial resistance connected with food from animals are, however, inadequately understood.

The magnitude and spread of infectious diseases are further accentuated by changes in human behaviour, changes in ecology and climate, in land use patterns and economic development. Modern travel and international migration also contribute; and above all else, so do inadequate or faltering public health infrastructures for monitoring and responding to outbreaks of disease.

Together, these factors have created perhaps the richest opportunities ever for the spread of infections, many of which become global problems that make the first line of defence – early recognition and adequate and timely response – essential.

Fortunately, we also have some of the richest opportunities ever to prevent and control these diseases. Cost-effective interventions exist for diseases

Fig. 8. Rural and urban population by age, 1990–2025



Source: World Urbanization Prospects, The 1992 Revision, United Nations.

which may be described as ***"old diseases – old problems"***.

(1) Immunization of children against six vaccine-preventable diseases – diphtheria, pertussis, tetanus, poliomyelitis, measles and tuberculosis – with the addition of hepatitis B and yellow fever vaccine for selected countries (and vitamin A and iodine supplements in regions where deficiencies of these micronutrients are highly prevalent) costs about \$14.6 per child or \$0.5 per capita in low-income countries.

(2) The integrated approach to the management of the sick child to prevent premature death among children with acute respiratory infections, diarrhoea, malaria, malnutrition and/or measles costs about \$1.60 per capita in low-income countries. Case management based on oral rehydration therapy is the cornerstone of the public health approach to controlling mortality from cholera.

(3) Provision of adequate clean drinking-water and of basic sanitation facilities and collection of household garbage, as well as simple personal hygiene measures like washing hands after defecation and before preparing food can prevent viral diseases such as hepatitis A and gastroenteritis; bacterial diseases including cholera, typhoid, paratyphoid and bacillary dysentery; protozoal diseases such as amoebic dysentery and giardiasis; and worm infections such as dracunculiasis, ascariasis and trichuriasis.

(4) School health programmes which treat worm infections and micronutrient deficiencies and provide health education cost about \$0.5 per capita in low-income countries; periodic deworming of school-children using single-dose anthelminthics such as albendazole or mebendazole is highly effective, cheap and safe. Oral treatment of infected school-age children is also an effective intervention against schistosomiasis.

(5) Case management of conventional sexually transmitted diseases using simple algorithms to decide on the appropriate diagnosis and treatment in peripheral health facilities costs \$11 per case in low-income countries.

Periodic deworming of school-children using single-dose anthelminthics such as albendazole or mebendazole is highly effective, cheap and safe.

The second category of diseases – ***"old diseases – new problems"*** – includes tuberculosis, malaria, dengue and other insect-borne diseases. For many of them, cost-effective interventions also exist, but the development of antimicrobial drug resistance or of pesticide resistance poses a greater threat to public health. Treating resistant infections often requires the use of additional or more expensive and more toxic alternative drugs and can result in longer hospital stays.

The strategy for controlling these diseases is through available cost-effective interventions such as early diagnosis and prompt treatment, vector control measures and the prevention of epidemics, for malaria; and DOTS – directly observed treatment, short-course – for tuberculosis; by launching research initiatives for treatment regimens and improved diagnostics, drugs and vaccines; and above all by strengthening epidemiological surveillance and drug-resistance surveillance mechanisms and procedures with appropriate laboratory support for early detection, confirmation and communication.

The third category of diseases – ***"new diseases – new problems"*** – such as Ebola and other viral haemorrhagic fevers, is probably the most frightening. Their natural history is unknown, and our understanding of the factors responsible for, or contributing to their emergence, and how they interact, is incomplete. The need therefore is for expanding research on infectious disease agents, their evolution, the vectors of disease spread and methods of controlling them, and vaccines and drug development. Much of this already applies to HIV/AIDS, one of the most serious diseases to emerge in recent decades.

The priority requirements for this are:

(1) improving infectious disease surveillance systems at national and international levels;
(2) responding rapidly to urgent threats to public health;
(3) developing appropriate prevention strategies to combat new and re-emerging infectious diseases;
(4) integrating laboratory science and epidemiology to optimize public health practice.

The early warning system for infectious diseases relies on public health laboratories with qualified staff; the timely development, availability and appropriate use of diagnostic tests and agents; and enhanced communication of public health information (*Box 19*) to help speed prevention measures.

Global surveillance for recognition of and response to emerging diseases is being strengthened in WHO, making maximum use of existing WHO collaborating centres located throughout the world. WHO aims to enhance laboratory capabilities for rapid recognition of new outbreaks as they occur. It will complement this effort with a stronger intervention capacity at WHO headquarters to ensure, in conjunction with the regional offices, a range of prompt, coordinated actions. These include organization and mobilization of international response teams; provision of technical and logistic support; mobilization of resources and management of funds; and communication with the press and other media.

WHO has also developed WHONET, a computer program designed to facilitate management of the results of antibiotic susceptibility tests for use by microbiology laboratories (*Box 5*, page 21). The network will allow ongoing surveillance of antimicrobial resistance at local, regional and global levels.

Box 19. PHLIS: An electronic system for reporting public health data from remote sites

Disease surveillance is conducted in the United States by the Centers for Disease Control and Prevention (CDC) in cooperation with state health departments with the aid of databases that catalogue disease information and data. These systems, while useful, have traditionally addressed the needs only of a single disease-specific programme. A broader, more flexible system that could be installed in any site was essential. The Public Health Laboratory Information System (PHLIS) was therefore developed for local, state or national organizations.

PHLIS is a personal computer-based reporting system that can capture most types of public health data from multiple sources (e.g. hospitals, laboratories, state or country offices) and accommodate electronic transmission of these data between sending and receiving sites. Data entry screens (modules) can be created and distributed to all reporting sites electronically, so that data can be input and reported via these modules within hours, without involving computer programmers. PHLIS also provides the capacity for a hierarchical reporting scheme involving reports to multiple, successively higher reporting levels.

The most recent version of PHLIS (version 3.0), is a menu-driven system based on a relational data model sufficient for the needs outlined earlier. The system requires a patient record to be input only once and links multiple specimens for the patient record. It provides a core set of data to be collected on every patient. Field staff (non-programmers) can rapidly add their own data fields to existing disease modules to customize the data entry for special needs at each data reporting site. In addition, PHLIS allows non-programmers to access disease modules, incorporate them into their system and send them electronically to any other reporting site, which can automatically assimilate them into their PHLIS system. During an outbreak, a new module can be rapidly developed and electronically transmitted to all participating reporting sites.

The system, which includes data communication software, is configured so that data flow in a pyramidal reporting structure: that is, upwards through higher-level reporting sites and ultimately to a single central site. Additional information about a case or specimen may be added at any reporting site.

To meet the need for feedback, PHLIS has provided a menu option to transmit files or messages both up and down the reporting chain. This facility is flexible enough to allow any valid user in the chain to transmit files or messages to any other user.

The public health benefits of PHLIS include reducing data entry due to electronic transmission of reports; reducing paper-based record-keeping; and access to timely summaries offered through feedback, ensuring that data are current and responses to enquiries at each reporting site are timely.

PHLIS requires only a personal computer with DOS of 3.1 or higher, a hard disk (at least 10 megabytes free hard disk space are recommended), and 4 megabytes of memory. PHLIS also provides access to EPI-INFO and EPI-MAP. For further information on PHLIS contact Mr Stan Martin (404-639-4701) or Dr Nancy Bean (404-639-4703), National Center for Infectious Disease, Centers for Disease Control and Prevention (CDC), 1600 Clifton Road, Mail Stop C09, Atlanta, Georgia 30333, USA, or electronic mail at nthl@ciddbdl.em.cdc.gov.

Box 20. Smallpox: the final chapter

1996 marks the 200th anniversary of an event that led to one of mankind's greatest achievements – the eradication of smallpox. In May 1796, the English physician Edward Jenner (1749-1823) realized that many of his patients who had been exposed to the much milder but related disease, cowpox, were immune to smallpox.

In the first example of immunization, he inoculated an 8-year-old boy with cowpox virus. After observing the reaction, he reinoculated him with smallpox virus – and the boy did not develop the killer disease. Jenner's procedure was soon widely accepted, resulting in sharp falls in smallpox death rates.

However, less than 30 years ago, smallpox was still endemic in 32 countries; 10-15 million people a year were stricken by it, nearly 2 million a year died of it, and millions of survivors were disfigured or blinded for life. Today it affects nobody. The disease has disappeared, and the cost of getting rid of it – approximately $313 million over ten years – has been repaid many times over in savings in human lives and in costs of vaccines, treatment and international surveillance activities.

The smallpox eradication campaign began in 1967 with the systematic vaccination of entire populations in endemic countries – an enormous and complex exercise. The strategy soon became "surveillance and containment". Every time a new case was discovered, it was followed up and contacts of the patient traced. Where such cases occurred, local immunization was intensified.

The incidence of the disease fell rapidly. By 1972, cases were occurring in only eight of the endemic countries in Africa and southern Asia.

Huge technical and logistic difficulties had to be overcome in many countries, often aggravated by civil wars, political and social upheavals, and refugee movements. Eventually the last naturally acquired case of smallpox was reported in Somalia in 1977; in 1980, WHO's World Health Assembly declared the global eradication of the disease.

The final chapter of the smallpox story remains to be written, however. For the smallpox virus has not been completely destroyed. Stocks are still held at government research centres in the Russian Federation and the United States. A resolution from WHO's Executive Board to the World Health Assembly in May 1996 recommended that these stocks be destroyed in 1999.

Table 7. Diseases targeted for eradication or elimination

	Estimated prevalence (000) 1995	Target for 2000
Dracunculiasis	122	Eradication
Poliomyelitis	82	Eradication
Leprosy	1 833	Elimination
Neonatal tetanus	10 000 [a]	Elimination
Chagas disease	18 000	Elimination
Iodine deficiency disorders	655 000 [b]	Elimination

[a] 1995 reported value.

[b] 1993 estimate for goitre.

Priorities for action

In confronting infectious diseases as a whole, the ***first priority*** relates to the completion of unfinished business – in other words, to drive on towards the eradication or elimination of diseases such as poliomyelitis, guinea-worm infection, leprosy, neonatal tetanus and Chagas disease (*Table 7*). Relatively small financial resources are needed for this final stage. If they cannot be found, eradication or elimination will not be achieved; these diseases will exploit any easing of the campaign against them, and return with a vengeance. The eradication of smallpox (*Box 20*) shows the way forward. The lessons of malaria and tuberculosis must not be ignored, or the efforts and resources already invested will have been wasted. This must not be allowed to happen.

The ***second priority*** relates to tackling old diseases such as tuberculosis and malaria which present new problems of drug resistance. Cost-effective interventions to prevent the spread of the disease in the community by removing the infectious source and to make a major impact on the prevalence of the disease by curing a high proportion of infectious cases exist; the concern is over the emergence of drug resistance. An appropriate epidemiological surveillance and control activity for these diseases should be established and research for the development of better treatment regimens and improved diagnostics, drugs and vaccines should be promoted and supported.

To ensure the protection of children against an ever-widening range of diseases, research into and the development of new and improved vaccines against measles, neonatal tetanus, bacterial meningitis, tuberculosis and other diseases must be supported (*Box 21*).

At the same time there is an urgent need to strengthen the capability for surveillance and control of infectious diseases in several of the countries that have been experiencing repeated outbreaks of epidemics during the past few years. Such improvements should include the integration of clinical, epidemiological and laboratory components and epidemiological expertise and laboratory resources in national centres which can then join with others in a comprehensive network forming part of an effective global surveillance and response system.

The ***third priority*** relates to the category of newly emerging diseases, where there is little knowledge of their natural history or incomplete understanding of the factors responsible for them. They require rapid action on one hand, and a more calculated, longer-term approach on the other. Responding speedily to outbreaks of important new infections, wherever they occur, is of direct benefit not merely to the individual affected country but to the global community. At the same time, there is a need for intensive research on new diseases and on the potential for preventing, treating and controlling them. Such research must be coupled with a global surveillance programme to recognize and respond to emerging diseases. WHO has begun to strengthen its capacity to respond rapidly and more efficiently to calls for help in such emergencies, and aims to have a team of experts at the location of an outbreak anywhere in the world within 24 hours of being officially notified of it. Extra resources are being sought to fund these operations.

The World Health Report 1995 indicated how poverty could be alleviated by enabling the poor to earn their way out of poverty and by enhancing their health potential through measures for prevention of diseases, promotion of positive health and for protection from health hazards, thereby improving their social and economic productivity. This report has outlined opportunities that exist now for improving the health of the present generation while laying the foundation for better health for future generations.

Box 21. New and improved vaccines for tomorrow's children

Every year, hundreds of millions of people, most of them infants, are protected by vaccines against deadly diseases of childhood and adulthood. As a result poliomyelitis, measles and neonatal tetanus are likely to be eliminated within the next few years. The constant quest for new and improved vaccines offers the prospect of protecting the children and adults of tomorrow against an ever-widening range of diseases.

WHO is actively supporting the research into and development of both improved vaccines and completely new ones for diseases which so far have not been preventable by immunization. This latter category includes acute respiratory viral diseases, diarrhoeal diseases, bacterial meningitis and tuberculosis, which together kill many millions of people, most of them children under 5, every year.

Brief progress reports of work on some of the new or improved vaccines are given below.

Measles. Three candidate vaccines intended for infants under 6 months of age should be studied in primates in 1996, and the target for 1998–2000 is to have at least one of them evaluated in human studies.

Neonatal tetanus. The goal is to develop vaccines simpler to deliver than existing ones, with particular emphasis on reducing the number of doses needed to induce long-lasting protection. Goals include having at least one such vaccine ready for clinical trials in 1996–1997, and introducing a single-dose tetanus vaccine into human use by 1998–2000.

Dengue and Japanese encephalitis. The aim is to accelerate the final development of attenuated dengue vaccine and genetically engineered dengue and Japanese encephalitis vaccines. Targets for 1998–2000 are to have one dengue vaccine evaluated for effectiveness and plans made to introduce it into immunization programmes in at least one country; and to have evaluated one new Japanese encephalitis vaccine in clinical trials.

Diarrhoeal diseases. Priority is being given to the development of vaccines against shigellosis and rotavirus diarrhoea. Research groups are working towards vaccines that are effective against both the recently isolated cholera strain 0139 and the more common 01 strain. Studies related to the potential use of cholera vaccines in refugee camps are being conducted. Vaccines against *E.coli* diarrhoea and typhoid are being developed. Shigellosis vaccines should be available by 1998–2000, and evaluations of typhoid, *E.coli* and cholera vaccines should be completed within the same period.

Bacterial meningitis. The intention is to test two new vaccines against the disease in infants in at least two developing countries by 1997.

Tuberculosis. Although the existing BCG vaccine prevents severe tuberculosis in children, it has a rather poor impact on the disease in adolescents and adults. Research is ongoing to develop a new and more efficient tuberculosis vaccine. At least one such candidate vaccine should have been evaluated in clinical studies by 1998–2000.

Annex 1

New infectious diseases

Examples of etiological agents and infectious diseases in humans and/or animals recognized since 1973.

*Year**	*Agent*	*Type*	*Disease/Comments*
1973	Rotavirus	Virus	Major cause of infantile diarrhoea worldwide
1975	Parvovirus B19	Virus	Aplastic crisis in chronic haemolytic anaemia
1976	*Cryptosporidium parvum*	Parasite	Acute and chronic diarrhoea
1977	Ebola virus	Virus	Ebola haemorrhagic fever
1977	*Legionella pneumophila*	Bacterium	Legionnaires' disease
1977	Hantaan virus	Virus	Haemorrhagic fever with renal syndrome (HRFS)
1977	*Campylobacter jejuni*	Bacterium	Enteric pathogen distributed globally
1980	Human T-lymphotropic virus 1 (HTLV-1)	Virus	T-cell lymphoma-leukaemia
1981	Toxin-producing strains of *Staphylococcus aureus*	Bacterium	Toxic shock syndrome
1982	*Escherichia coli* 0157:H7	Bacterium	Haemorrhagic colitis; haemolytic uraemic syndrome
1982	HTLV-2	Virus	Hairy cell leukaemia
1982	*Borrelia burgdorferi*	Bacterium	Lyme disease
1983	Human immunodeficiency virus (HIV)	Virus	Acquired immunodeficiency syndrome (AIDS)
1983	*Helicobacter pylori*	Bacterium	Peptic ulcer disease
1985	*Enterocytozoon bieneusi*	Parasite	Persistent diarrhoea
1986	*Cyclospora cayetanensis*	Parasite	Persistent diarrhoea
1986	BSE agent?	Non-conventional agent	Bovine spongiform encephalopathy in cattle
1988	Human herpesvirus 6 (HHV-6)	Virus	Exanthem subitum
1988	Hepatitis E virus	Virus	Enterically transmitted non-A, non-B hepatitis
1989	*Ehrlichia chaffeensis*	Bacterium	Human ehrlichiosis
1989	Hepatitis C virus	Virus	Parenterally transmitted non-A, non-B liver hepatitis
1991	Guanarito virus	Virus	Venezuelan haemorrhagic fever
1991	*Encephalitozoon hellem*	Parasite	Conjunctivitis, disseminated disease
1991	New species of *Babesia*	Parasite	Atypical babesiosis
1992	*Vibrio cholerae* 0139	Bacterium	New strain associated with epidemic cholera
1992	*Bartonella henselae*	Bacterium	Cat-scratch disease; bacillary angiomatosis
1993	Sin Nombre virus	Virus	Hantavirus pulmonary syndrome
1993	*Encephalitozoon cuniculi*	Parasite	Disseminated disease
1994	Sabia virus	Virus	Brazilian haemorrhagic fever
1995	Human herpesvirus 8	Virus	Associated with Kaposi's sarcoma in AIDS patients

* The year may differ from that given in *Map 2* which relates to first appearance or first identification of cases.

Adapted from: *Report of the NSTC Committee on International Science, Engineering, and Technology (CISET) Working Group on Emerging and Re-emerging Infectious Diseases. Global microbial threats in the 1990s.*

Annex 2

Members and Associate Members of WHO

WHO has 190 Members and two Associate Members. They are listed below with the date on which they became a party to the constitution or were admitted to associate membership.

Afghanistan	19 April 1948
Albania	26 May 1947
Algeria*	8 November 1962
Angola	15 May 1976
Antigua and Barbuda*	12 March 1984
Argentina*	22 October 1948
Armenia	4 May 1992
Australia*	2 February 1948
Austria*	30 June 1947
Azerbaijan	2 October 1992
Bahamas*	1 April 1974
Bahrain*	2 November 1971
Bangladesh	19 May 1972
Barbados*	25 April 1967
Belarus*	7 April 1948
Belgium*	25 June 1948
Belize	23 August 1990
Benin	20 September 1960
Bhutan	8 March 1982
Bolivia	23 December 1949
Bosnia and Herzegovina*	10 September 1992
Botswana*	26 February 1975
Brazil*	2 June 1948
Brunei Darussalam	25 March 1985
Bulgaria*	9 June 1948
Burkina Faso*	4 October 1960
Burundi	22 October 1962
Cambodia*	17 May 1950
Cameroon*	6 May 1960
Canada	29 August 1946
Cape Verde	5 January 1976
Central African Republic*	20 September 1960
Chad	1 January 1961
Chile*	15 October 1948
China*	22 July 1946
Colombia	14 May 1959
Comoros	9 December 1975
Congo	26 October 1960
Cook Islands	9 May 1984
Costa Rica	17 March 1949
Côte d'Ivoire*	28 October 1960
Croatia*	11 June 1992
Cuba*	9 May 1950
Cyprus*	16 January 1961
Czech Republic*	22 January 1993
Democratic People's Republic of Korea	19 May 1973
Denmark*	19 April 1948
Djibouti	10 March 1978
Dominica*	13 August 1981
Dominican Republic	21 June 1948
Ecuador*	1 March 1949
Egypt*	16 December 1947
El Salvador	22 June 1948
Equatorial Guinea	5 May 1980
Eritrea	24 July 1993
Estonia	31 March 1993
Ethiopia	11 April 1947
Fiji*	1 January 1972
Finland*	7 October 1947
France	16 June 1948
Gabon*	21 November 1960
Gambia*	26 April 1971
Georgia	26 May 1992
Germany*	29 May 1951
Ghana*	8 April 1957
Greece*	12 March 1948
Grenada	4 December 1974
Guatemala*	26 August 1949
Guinea*	19 May 1959
Guinea-Bissau	29 July 1974
Guyana*	27 September 1966
Haiti*	12 August 1947
Honduras	8 April 1949
Hungary*	17 June 1948
Iceland	17 June 1948
India*	12 January 1948
Indonesia*	23 May 1950
Iran (Islamic Republic of)*	23 November 1946
Iraq*	23 September 1947
Ireland*	20 October 1947

---

* Member States that have acceded to the Convention on the Privileges and Immunities of the Specialized Agencies and its Annex VII.

Israel 21 June 1949
Italy* 11 April 1947
Jamaica* 21 March 1963
Japan* 16 May 1951
Jordan* 7 April 1947
Kazakhstan 19 August 1992
Kenya* 27 January 1964
Kiribati 26 July 1984
Kuwait* 9 May 1960
Kyrgyzstan 29 April 1992
Lao People's Democratic Republic* 17 May 1950
Latvia 4 December 1991
Lebanon 19 January 1949
Lesotho* 7 July 1967
Liberia 14 March 1947
Libyan Arab Jamahiriya* 16 May 1952
Lithuania 25 November 1991
Luxembourg* 3 June 1949
Madagascar* 16 January 1961
Malawi* 9 April 1965
Malaysia* 24 April 1958
Maldives* 5 November 1965
Mali* 17 October 1960
Malta* 1 February 1965
Marshall Islands 5 June 1991
Mauritania 7 March 1961
Mauritius* 9 December 1968
Mexico 7 April 1948
Micronesia (Federated States of) 14 August 1991
Monaco 8 July 1948
Mongolia* 18 April 1962
Morocco* 14 May 1956
Mozambique 11 September 1975
Myanmar 1 July 1948
Namibia 23 April 1990
Nauru 9 May 1994
Nepal* 2 September 1953
Netherlands* 25 April 1947
New Zealand* 10 December 1946
Nicaragua* 24 April 1950
Niger* 5 October 1960
Nigeria* 25 November 1960
Niue 4 May 1994
Norway* 18 August 1947
Oman 28 May 1971
Pakistan* 23 June 1948
Palau 9 March 1995
Panama 20 February 1951
Papua New Guinea 29 April 1976
Paraguay 4 January 1949
Peru 11 November 1949
Philippines* 9 July 1948
Poland* 6 May 1948
Portugal 13 February 1948
Qatar 11 May 1972
Republic of Korea* 17 August 1949
Republic of Moldova 4 May 1992
Romania* 8 June 1948
Russian Federation* 24 March 1948
Rwanda* 7 November 1962
Saint Kitts and Nevis 3 December 1984
Saint Lucia* 11 November 1980
Saint Vincent and the Grenadines 2 September 1983
Samoa 16 May 1962
San Marino 12 May 1980
Sao Tome and Principe 23 March 1976
Saudi Arabia 26 May 1947
Senegal* 31 October 1960
Seychelles* 11 September 1979
Sierra Leone* 20 October 1961
Singapore* 25 February 1966
Slovakia* 4 February 1993
Slovenia* 7 May 1992
Solomon Islands 4 April 1983
Somalia 26 January 1961
South Africa 7 August 1947
Spain* 28 May 1951
Sri Lanka 7 July 1948
Sudan 14 May 1956
Suriname 25 March 1976
Swaziland 16 April 1973
Sweden* 28 August 1947
Switzerland 26 March 1947
Syrian Arab Republic 18 December 1946
Tajikistan 4 May 1992
Thailand* 26 September 1947
The Former Yugoslav Republic of Macedonia 22 April 1993
Togo* 13 May 1960
Tonga* 14 August 1975
Trinidad and Tobago* 3 January 1963
Tunisia* 14 May 1956
Turkey 2 January 1948
Turkmenistan 2 July 1992
Tuvalu 7 May 1993
Uganda* 7 March 1963
Ukraine* 3 April 1948
United Arab Emirates 30 March 1972
United Kingdom of Great Britain and Northern Ireland* 22 July 1946
United Republic of Tanzania* 15 March 1962
United States of America 21 June 1948
Uruguay* 22 April 1949
Uzbekistan 22 May 1992
Vanuatu 7 March 1983
Venezuela 7 July 1948
Viet Nam 17 May 1950
Yemen 20 November 1953
Yugoslavia* 19 November 1947
Zaire* 24 February 1961
Zambia* 2 February 1965
Zimbabwe* 16 May 1980

Associate Members

Puerto Rico 7 May 1992
Tokelau 8 May 1991

---

* Member States that have acceded to the Convention on the Privileges and Immunities of the Specialized Agencies and its Annex VII.

Annex 3

Statistics

Notes

... Data not available or not applicable

"Billion" means a thousand million

$ denotes United States dollars

Unless specified otherwise, data refer to 1995

Explanatory notes

The *World Health Report 1996 – Fighting disease, fostering development* presents an overview of the global health situation based on an assessment carried out in 1995, using 1995 or latest available data. The content of the Report was determined essentially by the theme of the Report as well as by the availability of information concerning key health and health-related indicators. The majority of Member States still experience great difficulty in obtaining valid and timely data on many indicators such as disease morbidity and health care coverage. Official statistics reported to WHO were incomplete, often not comparable among countries, nor up to date. It has often been necessary for international comparative studies to supplement data from a variety of national reports and publications with reasonably reliable estimates for one or more indicators. Considerable efforts were made to assemble and validate the best available and reasonably reliable data from such sources as reports and publications of WHO regional offices, WHO technical programmes, WHO collaborating centres and personal communications. Reference was also made to publications and documents of other intergovernmental bodies and nongovernmental organizations. The Population Division of the Department for Economic and Social Information and Policy Analysis of the United Nations, hereinafter referred to as United Nations Population Division, was the main source for estimates relating to demographic indicators including life expectancy at birth and infant mortality. A number of statistical values such as the *under-5 mortality rate* were derived from those estimates, but otherwise no attempt was made, for the present Report, to refine figures taken from recognized international sources and research publications.

Surveillance data for a number of infectious diseases of major public health concern are lacking; global and regional estimates of prevalence, incidence and even mortality are not available except for a few diseases. Using whatever reliable estimates were available, efforts were made to assess diseases/conditions according to their effect on people's health at different stages of life, i.e. children, school-age children and adolescents, adults and the elderly, in order to provide an overview of the situation and trends.

Because many of WHO's activities in different fields are interdependent, programmes were clustered and their activities, products and other outputs synthesized according to objectives and target age groups, the aim being to provide a global overview of WHO's work during the year 1995, irrespective of the organizational level at which activities were carried out, i.e. country, regional or interregional.

As of 31 December 1995 WHO had 190 Members and two Associate Members (see *Annex 2*). During 1995 Palau became a Member and Mongolia, formerly part of the South-East Asia Region, joined the Western Pacific Region. The global health assessment relates only to Member States. For analytical purposes they have been grouped according to the United Nations classification (shown below). In 1995 the United Nations General Assembly decided "to add Angola and Eritrea to the list of least developed countries, and to graduate Botswana from the list" (resolution 49/133).

Developed market economies. Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Portugal, San Marino, Spain, Sweden, Switzerland, United Kingdom, United States of America.

Economies in transition. Albania, Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia and former USSR (Baltic republics, Commonwealth of Independent States, Georgia).

Developing countries – excluding least developed countries. Algeria, Antigua and Barbuda, Argentina, Bahamas, Bahrain, Barbados, Belize, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Cameroon, Chile, China, Colombia, Congo, Cook Islands, Costa Rica, Côte d'Ivoire, Croatia, Cuba, Cyprus, Democratic People's Republic of Korea, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Fiji, Gabon, Ghana, Grenada, Guatemala, Guyana, Honduras, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Jamaica, Jordan, Kenya, Kuwait, Lebanon, Libyan Arab Jamahiriya, Malaysia, Malta, Marshall Islands, Mauritius, Mexico, Micronesia (Federated States of), Mongolia, Morocco, Namibia, Nauru, Nicaragua, Nigeria, Niue, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Qatar, Republic of Korea, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Saudi Arabia, Senegal, Seychelles, Singapore, Slovenia, South Africa, Sri Lanka, Suriname, Swaziland, Syrian Arab Republic, Thailand, The Former Yugoslav Republic of Macedonia, Tonga, Trinidad and Tobago, Tunisia, Turkey, United Arab Emirates, Uruguay, Venezuela, Viet Nam, Yugoslavia, Zimbabwe.

Least developed countries. Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Cape Verde, Central African Republic, Chad, Comoros, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao People's Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Maldives, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Samoa, Sao Tome and Principe, Sierra Leone, Solomon Islands, Somalia, Sudan, Togo, Tuvalu, Uganda, United Republic of Tanzania, Vanuatu, Yemen, Zaire, Zambia.

Throughout the Report "developed world" refers to countries classified as "developed market economies" and "economies in transition"; and "developing world" to "least developed countries" (LDCs) and other "developing countries". In some cases the "developed world" has also been referred to as the "industrialized countries" in the text.

The designations used for groupings of countries in the text and tables are intended solely for statistical and analytical convenience and do not necessarily express a judgement about the stage reached by a particular country in the development process.

As countries are added to or removed from a particular group, revised estimates are computed for the groups and subgroups of countries retroactively to ensure comparability over time. Accordingly, data by WHO region or by the United Nations classification in this Report may differ from comparable figures presented in *The World Health Report 1995*.

A major constraint in the assessment of the global health situation relates to data on ***health status***. There are no clear *positive measures* of health. Even in respect of *negative ill-health measures*, little information is at present available on disability and the data on incidence and prevalence of diseases, particularly in the developing world, are notoriously unreliable and enormously variable. Although mortality data are imperfect, they are nevertheless used to illustrate general patterns and orders of magnitude of major health problems. This Report, based primarily on four distinct measures of ill-health – mortality, incidence, prevalence and disability (long-term) – uses reasonably reliable data and estimates from a variety of statistical sources. For example, the United Nations Population Division biennially assesses the global demographic situation and makes estimates of *numbers of deaths by age and sex* for many countries, most recently in 1994. The Report uses these results. While major differences may be considered indicative of actual disparities and trends, caution is necessary in interpreting small differences in values of different groups.

Country data on ***cause of death***, even in respect of infectious diseases, pose a problem. Underreporting, imprecise listing of causes and inaccurate diagnosis complicate both national and international studies of mortality. Furthermore, attributing death to specific causes often results in overlap of underlying causes and also masks underlying conditions such as anaemia and nutritional deficiencies. Efforts were made to compensate for the paucity of data by preparing "guesstimates" in accordance with epidemiological and statistical principles and procedures, to ensure a reasonable degree of reliability, and of international comparability.

Global values for mortality, morbidity and disability associated with a large number of diseases and conditions were determined following extensive consultation with experts within the Organization and at WHO collaborating centres, concerning the quality and consistency of the estimates. Judicious use was made of available data from a variety of sources and the most recent data were reviewed, interpreted and extrapolated in a global context. Even in respect of infectious diseases, coverage is restricted to those of major public health concern and falls far short of the total spectrum of such diseases covered by the *International statistical classification of diseases and related health problems, tenth revision* (ICD-10). The resulting figures relating to 1995 indicate orders of magnitude of health problems associated with these selected diseases, but they lack the degree of precision necessary for disease-specific analysis.

To carry out its *directing* and *coordinating* functions at international and regional levels, since 1990 WHO has been incrementally developing its database on global and regional estimates of mortality and morbidity by diseases/conditions, based on official country data supplemented by reliable national and international estimates. The extensive use, in this Report, of data based on estimates and other indirect approaches should not, however, give the mistaken impression that the necessary data are already being collected by all developing and developed countries; rather, it is a matter of concern that use of such estimates may detract from the current efforts being made to compile accurate and timely data on health indicators in the developing world. Empirical data continue to be essential for identifying problems and working out solutions in the area of health development. It would thus be appreciated if readers would send their comments and suggestions for improving the quality of the estimates and assist WHO by suggesting more reliable data sources for use in the future.

Primary sources of data

***Table A* – Basic indicators** gives data on key health and health-related indicators concerning the world health situation. It contains data for 1995 or for the latest available year during the period 1990-1994 in respect of WHO's 190 Member States.

The following indicators which were used in last year's Report have been updated: life expectancy at birth, under-5 mortality rate, infant mortality rate, total population, percentage of population aged 65 years and above, percentage of population in urban areas, age and sex standardized death rate, total fertility rate, maternal mortality ratio (pregnancy-related), immunization coverage data (BCG, DPT3, OPV3, measles and tetanus toxoid 2), reported cases of tuberculosis, malaria, polio, measles and neonatal tetanus, access to safe water and adequate sanitation, adult literacy rate (both sexes and female), GNP per capita and average annual growth of GNP per capita.

New indicators added this year are: net migration rate, age-specific death rates for the age group 20-64, neonatal mortality rate, perinatal mortality rate, institutional delivery, underweight prevalence among preschool children, immunization coverage for hepatitis B, HIV prevalence estimates, AIDS (reported cases), average annual external debt ratio and military expenditure.

Data for most of the indicators were assembled by WHO from the various sources listed; data concerning health status and health care were taken from WHO publications or are estimates made by WHO programmes on the basis of information supplied by Member States. Although every effort was made to standardize the data for international comparison, care must be taken in making comparisons and interpreting the values.

***Table B* – Analytical tabulations** are primarily based on the values given in *Table A*. In addition, the following health-related indicators appear only in *Table B*: crude death rate, age-specific death rates for the age groups 5-19 and 65 years and above, unsafe abortion, anaemia in pregnant women and HIV/tuberculosis co-infection among adults. Figures refer to all 190 Member States, which in 1995 had an estimated population of 5 701 million, or 99.7% of the world population. The population data are estimates of the United Nations Population Division following the 1994 population assessment. These figures serve as denominators for various rates and weights used for computing the aggregate values in *Table B*. Further details are given in the reference publications and documents listed in each case under *Source*.

All tables and figures, and maps 2-5, 7 and 8 are based on data shown in *Table A* or *Table B*, or are compiled especially for the Report by WHO technical programmes.

1. Population and demography

Data relate to population size, growth rate, age and sex distribution, population in urban areas and megacities (agglomerations ≥ 8 million); net migration rate; total fertility rate; elderly support ratio (number of persons aged 65 or above per 100 persons aged 20-64).

Sources:

(a) *World Population Prospects (with supplementary tabulations), 1994 revision*. New York, United Nations, 1995.

(b) *Demographic Indicators 1950-2050, 1994 revision; Sex and Age Annual 1950-2050, 1994 revision*. New York, United Nations, 1995. (Databases).

(c) *World Urbanization Prospects, 1994 revision*. New York, United Nations, 1995.

2. Health status

2.1 ***Global health situation: mortality, morbidity and disability, selected infectious diseases of global and regional concern, all ages, 1995 estimates.***

Source: WHO.

2.2 ***Crude death rate, infant mortality rate, life expectancy at birth, life expectancy at birth – female advantage (difference between female and male life expectancy at birth).***

Sources: see section 1- Population and demography, above.

2.3 ***Under-5 mortality rate*** refers to the annual number of deaths of children under 5 years per 1 000 live births. More specifically, it measures the probability of dying between birth and exactly 5 years of age.

Source: The rate was calculated by the Office of World Health Reporting based on data given in the *World Population Prospects, 1994 revision*, using the formula provided by the United Nations Population Division.

2.4 ***Age and sex standardized death rate*** is obtained by applying the age- and sex-specific death rates of a given population to a standard population; the standard population being the world population, estimated at 5.5 billion, for the years 1990-1995 (*source 1a and 1b*).

Source: WHO.

2.5 ***Age-specific death rates*** refer to the number of deaths in age groups 5-19, 20-64 (male), 20-64 (female) and 65 and above per 100 000 population in the same age and sex groups (*source 1a and 1b*).

Source: WHO.

2.6 **Neonatal mortality rate** is the number of neonatal deaths per 1 000 live births. Neonatal deaths are deaths occurring during the neonatal period, commencing at birth and ending 28 completed days after birth.
Source: WHO.

2.7 **Perinatal mortality rate** refers to the number of perinatal deaths per 1 000 live births. Perinatal deaths are deaths occurring during the perinatal period, commencing at 22 completed weeks of gestation (the time when birth weight is normally 500 g), and ending seven completed days after birth.
Source: WHO.

2.8 ***Maternal mortality ratio (pregnancy-related)*** is the number of deaths of women occurring over a year while pregnant, or within 42 days of termination of pregnancy, *irrespective of the cause of death*, per 100 000 live births in that year.
Source: WHO.

2.9 ***Underweight prevalence among preschool children*** refers to the percentage of children under 5 years of age who have a weight that is below minus two standard deviations from the median weight-for-age of the reference population. In view of limitations in estimation procedures, the values in *Table A* are presented in four broad categories: less than 10%; 10-19%; 20-29%; 30% or more.
Sources:
(a) WHO.
(b) United Nations Administrative Committee on Coordination – Sub-Committee on Nutrition (personal communication).

2.10 ***HIV prevalence*** estimates give an indication of the magnitude of the HIV pandemic but should be considered provisional due to the difficulties in accurately assessing levels of HIV infection in national populations. In *Table A*, HIV prevalence among adults is given as a number while in *Table B* it is presented as a rate per 100 000 adult population.
Source: WHO.

2.11 ***HIV/tuberculosis co-infection among adults*** estimates the percentage of HIV infected adults, aged 15-49, who are simultaneously infected with tuberculosis.
Source: WHO.

2.12 ***Annual number of reported cases*** refers to the number of cases of selected diseases reported by WHO Member States for the year concerned: AIDS, tuberculosis, malaria, poliomyelitis, measles and neonatal tetanus.
Source: WHO.

2.13 ***Anaemia in pregnant women*** refers to the percentage of pregnant women with a haemoglobin level below 110 g/l.
Source: WHO.

3. Health care and environment

3.1 ***Institutional delivery*** refers to the number of deliveries in public and private hospitals, clinics and health centres, irrespective of who attended the delivery, per 100 live births.
Source: WHO.

3.2 ***Immunization coverage for BCG, DPT3, OPV3, measles and HBV3*** refers respectively to the percentages of infants surviving to age 1 who have been fully immunized with BCG, a third dose of diphtheria-pertussis-tetanus vaccine, a third dose of oral polio vaccine, measles vaccine and a third dose of hepatitis B vaccine. ***Immunization coverage for TT2*** refers to the percentage of pregnant women immunized with two or more doses of tetanus toxoid during pregnancy.
Source: WHO.

3.3 ***Access to safe water*** refers to the percentage of the population with safe drinking-water available in the home or with reasonable access to treated surface waters and untreated but uncontaminated water such as that from protected boreholes, springs and sanitary wells.

Access to adequate sanitation refers to the percentage of the population with adequate excreta-disposal facilities that can effectively prevent human, animal and insect contact with excreta.
Source: WHO.

3.4 ***Unsafe abortion*** is defined as a procedure for terminating an unwanted pregnancy either by persons lacking the necessary skills or in an environment lacking the minimal medical standards, or both. The data refer to the number of unsafe abortions per 1 000 women aged 15-49.
Source: WHO.

3.5 ***Regular access to essential drugs*** refers to the percentage of the population with regular financial and geographical access to the most needed essential drugs (20-30), whether generic or non-generic, in the public or private sector.
Source: WHO.

4. Education

4.1 ***Adult literacy rate.***
Source: *World Education Report 1995*. Paris, Unesco, 1995.

4.2 ***Public education expenditure as percentage of gross national product (GNP).***
Source: *World Education Report 1995*. Paris, Unesco, 1995.

5. Economy

5.1 ***Gross national product (GNP) per capita, average annual growth rate of GNP per capita.***
Source: World Bank. *World Development Report 1995*. New York, Oxford University Press, 1995.

5.2 ***External debt/GNP ratio.***
Source: World Bank. *World Debt Tables 1994-1995*. Vol.1. New York, Oxford University Press, 1994.

5.3 ***Military expenditure as percentage of GNP and military expenditure per capita.***
Source: *World Military Expenditures and Arms Transfers, 1993-1994*. Washington DC, US Arms Control and Disarmament Agency, 1995.

Table A1. Basic indicators

Estimates are obtained or derived from relevant WHO programmes or from responsible international agencies for the areas of their concern

Member States[a]	Life expectancy at birth (years) 1995	Under-5 mortality rate 1995	Infant mortality rate 1995	Population			Net migration rate (per 1 000) 1990–95	Life expectancy at birth (female advantage) (years) 1995	Age and sex standardized death rate (per 100 000) 1990–95	Age specific death rate 20–64 age group		Rate per 1 000 live births	
				Total (000) 1995	% aged 65 years and above 1995	% in urban areas 1995				Male 1990–95	Female 1990–95	Neonatal mortality 1995	Perinatal mortality 1995
WHO Member States with values above all three health-for-all targets[b]													
Africa													
Algeria	68	56	49	27 939	3.6	55.8	0.0	2.6	865	362	304	20	25
Botswana	66	60	40	1 487	2.4	28.1	0.0	3.8	938	527	430	20	25
Cape Verde	66	62	46	392	4.3	54.3	0.0	2.0	963	538	464	20	35
Mauritius	71	18	17	1 117	5.9	40.6	-3.1	6.8	755	598	292	20	35
Americas													
Argentina	73	26	23	34 587	9.5	88.1	0.0	7.1	639	597	300	20	30
Bahamas	74	24	21	276	5.1	86.5	1.4	9.0	628	603	300	25	25
Barbados	76	15	9	262	11.8	47.4	-3.5	5.0	505	316	216	10	20
Belize	74	38	31	215	4.2	46.8	-3.6	2.7	485	149	102	15	20
Canada	78	8	7	29 463	11.8	76.7	4.2	6.4	453	362	201	5	10
Chile	74	17	15	14 262	6.6	83.9	0.0	7.0	575	469	233	10	15
Colombia	70	41	36	35 101	4.5	72.7	-1.4	5.9	747	552	303	15	25
Costa Rica	77	15	13	3 424	4.7	49.7	1.5	4.7	477	282	167	10	20
Cuba	76	13	11	11 041	8.9	76.0	-1.8	3.8	513	382	271	10	15
Dominican Republic	70	48	37	7 823	4.0	64.6	-2.3	4.1	726	418	297	25	35
Ecuador	69	58	47	11 460	4.4	58.4	0.0	5.1	747	477	320	30	45
El Salvador	67	65	42	5 768	4.1	45.1	-4.6	5.0	857	596	385	25	35
Guatemala	66	69	44	10 621	3.5	41.5	-2.3	5.0	925	657	423	30	45
Guyana	66	63	45	835	4.0	36.2	-8.6	5.4	929	556	367	15	40
Honduras	69	52	39	5 654	3.1	43.9	-1.5	4.7	798	554	398	25	40
Jamaica	74	21	13	2 447	6.6	53.7	-8.7	4.4	580	335	243	20	40
Mexico	71	41	34	93 674	4.2	75.3	-1.8	6.1	679	498	262	25	40
Nicaragua	68	69	48	4 433	3.1	62.9	3.7	3.7	838	495	360	20	35
Panama	73	29	23	2 631	5.2	53.3	-1.1	4.4	596	388	246	15	25
Paraguay	71	47	37	4 960	3.8	52.7	0.2	3.8	714	367	280	20	40
Suriname	71	27	26	423	4.7	50.4	-8.5	5.0	746	520	286	15	20
Trinidad and Tobago	72	17	17	1 306	5.7	71.8	-3.8	4.8	675	456	313	10	25
United States of America	76	10	8	263 250	12.6	76.2	3.3	6.7	505	464	260	5	10
Uruguay	73	21	18	3 186	12.3	90.3	-1.0	6.5	634	638	374	15	25
Venezuela	72	25	22	21 844	4.1	92.8	0.0	5.8	645	467	258	15	35
Eastern Mediterranean													
Bahrain	72	25	17	564	2.7	90.3	3.8	4.3	650	330	228	15	20
Cyprus	77	9	8	742	10.1	54.1	0.0	4.5	466	287	138	5	10
Iran, Islamic Republic of	69	62	32	67 283	3.9	59.0	-2.4	1.1	815	420	360	25	30
Jordan	69	41	33	5 439	2.7	71.5	15.3	3.9	837	463	357	20	30
Kuwait	75	14	12	1 547	1.7	97.0	-86.7	4.0	525	191	117	15	30
Lebanon	69	37	31	3 009	5.5	87.2	12.8	3.8	820	517	371	15	25
Oman	70	34	27	2 163	2.7	13.2	3.4	4.3	756	422	312	20	30
Qatar	71	24	18	551	1.5	91.4	7.7	5.4	...	...	...	10	20
Saudi Arabia	71	31	26	17 880	2.7	80.2	-8.8	3.3	746	378	322	20	30
Syrian Arab Republic	68	44	36	14 661	2.8	52.4	-1.1	4.3	864	491	373	30	45
Tunisia	69	51	40	8 896	4.4	57.2	0.0	2.1	825	405	337	30	40
United Arab Emirates	74	20	17	1 904	1.7	84.0	5.6	2.5	582	223	130	15	20
Europe													
Albania	72	39	28	3 441	5.6	37.3	-8.9	5.8	641	341	175	10	15
Armenia	73	23	20	3 599	7.4	68.7	0.0	6.0	640	547	282	15	25
Austria	77	8	7	7 968	14.9	55.5	5.6	6.2	503	452	214	5	5
Azerbaijan	71	38	27	7 558	5.9	55.8	-4.1	7.7	709	611	286	20	30
Belarus	70	19	17	10 141	12.6	71.2	-1.8	10.6	758	994	393	10	15
Belgium	77	7	6	10 113	15.8	97.0	2.1	6.6	494	444	222	5	10
Bosnia and Herzegovina	73	20	14	3 459	7.8	49.0	-50.2	5.5	641	506	272	...	...
Bulgaria	71	17	14	8 769	14.5	70.7	-2.6	7.0	694	785	358	10	15
Croatia	72	17	8	4 495	12.8	64.4	-0.4	8.5	708	798	320	5	5
Czech Republic	71	9	9	10 296	12.5	65.4	0.0	7.2	731	751	365	5	10
Denmark	76	8	7	5 181	15.2	85.2	1.2	5.7	527	474	281	5	10
Estonia	69	19	16	1 530	12.7	73.1	-3.9	10.9	782	1 021	381	10	15

Member States[a]	Life expectancy at birth (years) 1995	Under-5 mortality rate 1995	Infant mortality rate 1995	Population: Total (000) 1995	Population: % aged 65 years and above 1995	Population: % in urban areas 1995	Net migration rate (per 1 000) 1990–95	Life expectancy at birth (female advantage) (years) 1995	Age and sex standardized death rate (per 100 000) 1990–95	Age specific death rate 20-64 age group: Male 1990–95	Age specific death rate 20-64 age group: Female 1990–95	Rate per 1 000 live births: Neonatal mortality 1995	Rate per 1 000 live births: Perinatal mortality 1995
Finland	76	6	5	5 107	14.1	63.2	2.0	7.7	522	543	201	5	5
France	77	9	7	57 981	14.9	72.8	1.3	7.6	475	500	214	5	10
Georgia	73	21	19	5 457	11.4	58.5	-5.5	8.2	628	702	300	15	15
Germany	76	7	6	81 591	15.2	86.5	7.2	6.3	516	489	247	5	5
Greece	78	10	9	10 451	15.9	65.2	4.1	5.1	446	400	198	5	15
Hungary	69	17	15	10 115	14.0	64.7	-2.0	9.3	806	1 089	468	10	10
Iceland	79	5	5	269	11.2	91.6	0.0	5.1	420	294	167	5	5
Ireland	76	7	7	3 553	11.3	57.5	-2.8	5.5	531	391	219	5	10
Israel	77	10	8	5 629	9.5	90.6	23.3	3.8	494	307	196	5	10
Italy	78	9	7	57 187	16.0	66.6	0.7	6.3	456	409	197	5	10
Kazakhstan	70	31	28	17 111	7.0	59.7	-7.1	8.7	756	737	330	20	30
Kyrgyzstan	70	40	33	4 745	5.8	38.9	-5.3	7.5	781	668	332	25	40
Latvia	69	19	14	2 557	13.3	72.8	-6.9	11.7	793	1 072	397	10	20
Lithuania	70	17	13	3 700	12.2	72.1	-2.7	11.2	728	972	364	10	15
Luxembourg	76	8	6	406	14.0	89.1	10.2	7.4	519	494	213	5	5
Malta	76	11	9	366	10.9	89.3	0.0	4.5	488	344	206	5	10
Netherlands	78	8	7	15 503	13.2	89.0	3.0	5.8	453	338	201	5	10
Norway	77	9	8	4 337	15.9	73.2	1.2	6.6	470	389	197	5	5
Poland	71	18	13	38 388	11.0	64.7	-1.3	9.0	706	796	324	15	20
Portugal	75	11	9	9 823	14.1	35.6	-2.4	6.8	556	519	238	5	10
Republic of Moldova	68	28	25	4 432	9.3	51.7	-2.3	8.1	854	941	493	15	30
Romania	70	29	22	22 835	11.8	55.4	-3.5	6.7	732	769	380	10	15
Russian Federation	68	26	20	147 000	12.1	76.0	0.3	12.0	858	1 140	425	15	20
Slovakia	71	14	12	5 353	10.8	58.8	0.0	8.9	722	825	305	10	15
Slovenia	73	12	7	1 946	12.4	63.5	3.1	9.6	650	769	274	5	10
Spain	78	8	7	39 621	14.9	76.5	1.1	5.8	444	395	191	5	5
Sweden	79	6	5	8 780	17.3	83.1	2.3	5.7	426	342	200	5	5
Switzerland	78	8	6	7 202	14.2	60.8	7.3	6.4	437	361	190	5	5
Tajikistan	71	57	45	6 101	4.3	32.2	-2.1	5.5	714	438	278	30	30
The Former Yugoslav Republic of Macedonia	72	37	24	2 163	8.1	59.9	2.9	6.1	656	445	233	15	15
Ukraine	69	20	16	51 380	14.0	70.3	0.8	9.9	785	1 032	427	10	15
United Kingdom	77	8	7	58 258	15.5	89.5	0.8	5.0	499	403	262	5	10
Uzbekistan	70	48	39	22 843	4.4	41.3	-2.9	6.0	760	530	311	25	45
South-East Asia													
Democratic People's Republic of Korea	72	27	23	23 917	4.6	61.3	0.0	6.4	710	442	278	15	20
Sri Lanka	72	20	16	18 354	5.8	22.4	-2.2	4.5	645	509	277	20	25
Thailand	69	43	35	58 791	5.0	20.0	-2.0	6.0	737	549	362	20	20
Western Pacific													
Australia	78	8	6	18 088	11.6	84.7	6.3	5.8	442	329	183	5	10
Brunei Darussalam	75	14	8	285	3.5	57.8	0.0	3.9	471	269	154	10	15
China	69	44	41	1 221 462	6.1	30.3	-0.1	3.6	790	469	302	35	45
Fiji	72	24	22	784	3.7	40.7	-4.0	4.3	683	398	285	5	10
Japan	80	6	4	125 095	14.1	77.6	0.0	6.1	388	340	186	5	5
Malaysia	71	23	12	20 140	3.9	53.7	0.0	4.4	696	456	320	10	20
New Zealand	76	10	9	3 575	11.3	86.1	3.5	6.0	518	410	236	5	5
Philippines	67	48	39	67 581	3.4	54.2	-2.8	3.6	890	531	414	20	25
Republic of Korea	72	13	10	44 995	5.6	81.3	-0.5	7.4	713	596	272	10	15
Singapore	75	10	6	2 848	6.7	100	0.0	5.1	542	345	207	5	5
Solomon Islands	71	30	25	378	2.9	17.1	0.0	4.2	801	412	323	20	40
Vanuatu	66	51	42	169	3.6	19.3	-3.1	3.9	1 086	606	529	25	50
Viet Nam	66	59	40	74 545	4.9	20.8	-0.4	4.6	931	580	390	20	25
WHO Member States with values below all three health-for-all targets[b]													
Africa													
Angola	48	184	118	11 072	2.9	32.2	4.9	3.2	1 982	1 186	999	40	90
Benin	48	161	83	5 409	2.8	31.3	0.0	3.4	1 864	1 151	973	40	75
Burkina Faso	47	189	126	10 319	3.1	27.2	-1.0	3.0	1 890	1 101	946	45	80
Burundi	51	146	99	6 393	3.0	7.5	-0.3	3.5	1 704	1 041	913	35	60
Cameroon	57	113	59	13 233	3.6	44.9	-0.9	3.0	1 373	864	715	40	75
Central African Republic	50	152	99	3 315	4.0	39.3	0.0	4.9	1 754	1 195	961	45	80
Chad	49	175	117	6 361	3.6	21.4	1.3	3.2	1 890	1 168	988	55	90

Member States[a]	Life expectancy at birth (years) 1995	Under-5 mortality rate 1995	Infant mortality rate 1995	Population			Net migration rate (per 1 000) 1990–95	Life expectancy at birth (female advantage) (years) 1995	Age and sex standardized death rate (per 100 000) 1990–95	Age specific death rate 20-64 age group		Rate per 1 000 live births	
				Total (000) 1995	% aged 65 years and above 1995	% in urban areas 1995				Male 1990–95	Female 1990–95	Neonatal mortality 1995	Perinatal mortality 1995
Comoros	57	114	84	653	2.5	30.7	0.0	1.0	1 417	796	762	45	60
Congo	51	134	84	2 590	3.3	58.8	0.0	4.5	1 631	1 179	967	45	80
Côte d'Ivoire	50	138	90	14 253	2.7	43.6	0.0	2.3	1 659	1 159	1 011	30	55
Equatorial Guinea	49	171	112	400	4.3	42.2	0.0	3.2	1 831	1 168	954	55	85
Eritrea	52	150	100	3 531	2.9	17.2	-0.6	3.2	1 704	1 037	865	45	75
Ethiopia	49	174	113	55 053	2.9	13.4	-0.7	3.1	1 900	1 133	961	60	100
Gabon	55	132	89	1 320	5.8	50.0	6.5	3.3	1 521	1 045	853	55	75
Gambia	46	193	127	1 118	2.9	25.5	13.3	3.2	2 050	1 216	1 009	60	110
Ghana	57	113	77	17 453	2.9	36.3	0.0	3.6	1 371	845	682	40	90
Guinea	45	200	129	6 700	2.6	29.6	0.0	1.0	2 115	1 192	1 094	70	130
Guinea-Bissau	45	207	135	1 073	4.1	22.2	0.0	3.2	2 182	1 356	1 156	50	85
Kenya	55	107	68	28 261	2.9	27.7	3.1	2.8	1 360	952	824	25	45
Liberia	56	155	119	3 039	3.7	45.0	0.0	3.0	1 382	938	751	65	130
Madagascar	58	125	93	14 763	2.8	27.1	0.0	3.0	1 393	761	622	40	65
Malawi	45	215	139	11 129	2.7	13.5	3.9	1.2	1 940	987	914	40	70
Mali	47	188	154	10 795	2.6	27.0	0.0	3.3	2 001	1 161	987	50	100
Mauritania	52	145	96	2 274	3.2	53.8	0.0	3.2	1 628	986	837	50	95
Mozambique	47	179	143	16 004	3.2	34.2	-2.6	3.0	1 963	1 295	1 127	65	105
Namibia	60	94	56	1 540	3.7	37.4	0.0	2.5	1 237	774	636	35	60
Niger	48	186	119	9 151	2.4	17.0	0.0	3.3	1 976	1 153	970	50	100
Nigeria	51	149	81	111 721	2.8	39.3	0.0	3.2	1 695	1 044	870	40	90
Rwanda	47	162	108	7 952	2.5	6.1	-1.6	2.9	1 889	1 271	1 111	40	65
Senegal	50	160	65	8 312	2.9	42.3	-1.8	2.0	1 762	1 053	914	35	80
Sierra Leone	40	246	160	4 509	3.0	36.2	0.0	3.1	2 561	1 520	1 301	40	80
Swaziland	59	103	70	855	2.6	31.2	0.0	4.6	1 317	801	601	35	55
Togo	56	121	81	4 138	3.1	30.8	0.0	3.6	1 434	892	722	45	90
Uganda	44	174	113	21 297	2.4	12.5	1.5	2.3	2 092	1 451	1 314	40	70
United Republic of Tanzania	52	128	83	29 685	2.6	24.4	0.0	2.9	1 588	1 084	935	40	65
Zaire	52	133	89	43 901	2.9	29.1	-1.2	3.1	1 594	1 055	912	50	80
Zambia	48	141	102	9 456	2.4	43.1	0.2	1.5	1 807	1 338	1 215	40	70
Zimbabwe	52	104	66	11 261	2.8	32.1	-1.4	2.4	1 495	1 134	1 016	25	40
Americas													
Bolivia	60	91	70	7 414	3.8	60.8	-1.4	3.3	1 220	782	622	35	55
Haiti	58	107	82	7 180	3.9	31.6	-3.1	3.4	1 381	901	809	55	95
Eastern Mediterranean													
Afghanistan	44	251	159	20 141	2.8	20.0	29.6	1.0	2 303	1 160	1 028	90	120
Djibouti	49	166	110	577	2.9	82.8	0.0	3.3	1 782	1 128	931	65	75
Somalia	48	180	117	9 250	2.7	25.7	-19.0	3.2	1 928	1 148	963	70	120
Sudan	54	115	75	28 098	2.9	24.6	0.0	2.8	1 555	1 017	892	45	55
Yemen	51	159	114	14 501	2.4	33.6	15.5	0.5	1 784	989	969	45	70
South-East Asia													
Bangladesh	57	148	102	120 433	3.1	18.3	-2.3	0.0	1 408	609	575	65	85
Bhutan	52	149	115	1 638	3.5	6.4	-12.6	3.3	1 703	1 129	954	75	100
Myanmar	59	99	78	46 527	4.1	26.2	0.0	3.3	1 320	858	707	35	55
Nepal	55	126	93	21 918	3.4	13.7	0.0	-0.5	1 557	944	923	55	75
Western Pacific													
Cambodia	53	142	109	10 251	2.6	20.7	0.3	2.8	1 670	955	882	50	65
Lao People's Democratic Republic	52	148	91	4 882	3.0	21.7	0.0	3.0	1 721	1 092	928	70	90
Papua New Guinea	57	84	65	4 302	2.9	16.0	0.0	1.5	1 508	1 074	976	30	55
Other WHO Member States													
Africa													
Lesotho	62	84	74	2 050	4.0	23.1	0.0	5.0	1 146	763	563	40	65
Sao Tome and Principe	...	...	...	*133*	...	*46.7*	...	...	...	...	...	...	...
Seychelles	...	...	...	*73*	...	*54.5*	...	...	...	...	...	...	...
South Africa	64	76	50	41 465	4.4	50.8	0.1	6.0	1 027	746	506	30	55

Member States[a]	Life expectancy at birth (years) 1995	Under-5 mortality rate 1995	Infant mortality rate 1995	Population			Net migration rate (per 1 000) 1990–95	Life expectancy at birth (female advantage) (years) 1995	Age and sex standardized death rate (per 100 000) 1990–95	Age specific death rate 20-64 age group		Rate per 1 000 live births	
				Total (000) 1995	% aged 65 years and above 1995	% in urban areas 1995				Male 1990–95	Female 1990–95	Neonatal mortality 1995	Perinatal mortality 1995
Americas													
Antigua and Barbuda	...	...	...	*66*	...	*35.8*	...	...	...	...	...	...	...
Brazil	67	70	56	161 790	5.2	78.2	0.0	4.6	844	554	441	30	45
Dominica	...	...	...	*71*	...	...	...	...	...	...	...	...	...
Grenada	...	...	...	*92*	...	...	...	...	...	...	...	...	...
Peru	67	73	61	23 780	4.1	72.2	-1.1	3.9	891	479	335	30	35
Saint Kitts and Nevis	...	...	...	*41*	...	*42.4*	...	...	...	...	...	...	...
Saint Lucia	...	...	...	*142*	...	*48.1*	...	...	...	...	...	...	...
Saint Vincent and the Grenadines	...	...	...	*112*	...	*47.0*	...	...	...	...	...	...	...
Eastern Mediterranean													
Egypt	65	73	61	62 931	4.2	44.8	1.0	2.5	998	534	448	35	45
Iraq	67	62	52	20 449	3.0	74.6	-6.7	3.0	885	538	428	25	40
Libyan Arab Jamahiriya	64	84	62	5 407	2.6	86.0	0.8	3.5	1 027	562	386	35	50
Morocco	64	80	62	27 028	4.1	48.4	0.0	3.5	1 012	524	407	35	45
Pakistan	63	107	82	140 497	3.0	34.7	-3.4	2.1	1 094	483	399	55	70
Europe													
Monaco	...	...	...	*32*	...	*100*	...	...	...	...	...	...	...
San Marino	...	...	...	*25*	...	*94.2*	...	...	...	...	...	...	...
Turkey	68	68	58	61 945	5.0	68.8	0.0	4.1	857	486	341	30	50
Turkmenistan	66	68	55	4 099	4.2	44.9	-1.5	6.8	940	656	377	40	60
Yugoslavia	...	...	...	...	...	...	...	...	...	...	...	...	...
South-East Asia													
India	62	102	77	935 744	4.6	26.8	-0.1	0.2	1 147	623	523	50	65
Indonesia	64	65	52	197 588	4.3	35.4	-0.8	3.6	1 052	681	546	35	45
Maldives	63	71	54	254	3.9	26.8	0.0	-2.6	1 109	583	491	30	45
Western Pacific													
Cook Islands	...	...	...	*19*	...	*60.4*	...	...	...	...	...	...	...
Kiribati	...	...	...	*79*	...	*35.7*	...	...	...	...	...	...	...
Marshall Islands	...	...	...	*54*	...	*69.1*	...	...	...	...	...	...	...
Micronesia, Federated States of	...	...	...	*124*	...	*28.0*	...	...	...	...	...	...	...
Mongolia	65	69	55	2 410	3.4	60.9	0.0	2.8	983	599	487	35	35
Nauru	...	...	...	*11*	...	*100*	...	...	...	...	...	...	...
Niue	...	...	...	*2*	...	*29.4*	...	...	...	...	...	...	...
Palau	...	...	...	*17*	...	*70.6*	...	...	...	...	...	...	...
Samoa	69	74	61	171	3.5	21.0	-20.4	3.4	...	...	...	10	20
Tonga	...	...	...	*98*	...	*41.1*	...	...	...	...	...	...	...
Tuvalu	...	...	...	*10*	...	*46.2*	...	...	...	...	...	...	...

---

[a] Italics indicate less populous Member States (under 150 000 population in 1990).

[b] The three targets in WHO's strategy for health for all by the year 2000 relating to health status are: life expectancy at birth above 60 years; under-5 mortality rate below 70 per 1 000 live births; infant mortality rate below 50 per 1 000 live births.

... Data not available or not applicable.

Table A2. Basic indicators

Estimates are obtained or derived from relevant WHO programmes or from responsible international agencies for the areas of their concern

Member States[a]	Maternal mortality ratio (pregnancy-related) 1990	Total fertility rate 1995	Institutional delivery (per 100 live births) 1990	Underweight prevalence among preschool children (%) 1995	Immunization coverage (%) 1995[b]						HIV prevalence[c] (estimated number) 1994
					Children immunized by age 12 months					Pregnant women	
					BCG	DPT 3	OPV 3	Measles[d]	HBV3	Tetanus toxoid 2[e]	
WHO Member States with values above all three health-for-all targets[f]											
Africa											
Algeria	160	3.6	60	10–19	93	75	75	69	...	36	10 000
Botswana	250	4.7	65	10–19	81	78	78	68	...	56	125 000
Cape Verde	...	4.1	50	10–19	80	73	73	66	...	98	...
Mauritius	120	2.3	75	< 10	86	89	89	85	...	78	500
Americas											
Argentina	100	2.7	80	< 10	96	66	70	76	...	...	60 000
Bahamas	100	2.0	...	10–19	...	91	91	88	...	68	6 000
Barbados	43	1.8	98	< 10	...	93	93	100	...	100	4 000
Belize	...	3.9	...	< 10	92	83	83	87	...	...	2 000
Canada	6	1.9	99	< 10	...	93	89	98	...	...	30 000
Chile	65	2.5	98	< 10	91	92	92	93	...	...	10 000
Colombia	100	2.6	65	< 10	99	91	92	77	...	14	40 000
Costa Rica	55	3.0	95	< 10	99	85	84	94	...	90	9 000
Cuba	95	1.8	...	< 10	99	100	96	100	...	55	1 300
Dominican Republic	110	2.9	90	< 10	88	100	94	100	...	87	40 000
Ecuador	150	3.3	50	< 10	95	80	78	100	...	19	16 000
El Salvador	300	3.8	50	< 10	100	100	94	94	...	47	15 000
Guatemala	200	5.1	20	10–19	79	78	83	84	...	33	20 000
Guyana	...	2.4	...	10–19	94	90	90	83	...	47	6 000
Honduras	220	4.6	40	10–19	99	96	96	90	...	48	40 000
Jamaica	120	2.2	80	< 10	100	93	93	82	...	...	12 000
Mexico	110	3.0	65	< 10	98	92	92	90	...	42	200 000
Nicaragua	160	4.8	45	10–19	100	85	96	81	...	49	1 500
Panama	55	2.8	85	< 10	99	86	86	84	...	24	8 000
Paraguay	160	4.1	55	< 10	89	77	77	76	...	87	2 600
Suriname	...	2.5	...	< 10	...	74	71	67	...	99	2 500
Trinidad and Tobago	90	2.3	96	< 10	...	81	78	87	...	19	6 000
United States of America	12	2.1	99	< 10	...	94	84	89	...	...	700 000
Uruguay	85	2.3	95	< 10	99	86	86	80	...	13	5 000
Venezuela	120	3.1	...	< 10	95	63	73	94	...	...	35 000
Eastern Mediterranean											
Bahrain	60	3.6	...	10–19	...	92	90	89	89	45	500
Cyprus	5	2.4	...	< 10	...	96	96	83	68	57	1 000
Iran, Islamic Republic of	120	4.8	60	10–19	99	97	97	95	81	82	1 000
Jordan	150	5.4	80	< 10	...	100	99	92	70	24	600
Kuwait	29	3.0	97	< 10	...	100	100	93	94	21	1 000
Lebanon	300	2.9	...	< 10	...	92	92	88	...	...	1 350
Oman	190	6.9	...	20–29	96	99	99	98	99	95	1 000
Qatar	...	4.1	99	< 10	96	91	91	86	90	...	290
Saudi Arabia	130	6.2	85	10–19	93	97	97	94	94	62	1 000
Syrian Arab Republic	180	5.6	55	10–19	100	100	100	98	76	76	700
Tunisia	170	3.0	70	< 10	75	90	90	89	...	46	2 000
United Arab Emirates	26	4.1	90	< 10	98	90	90	90	90	...	2 000
Europe											
Albania	65	2.8	...	...	97	97	98	91	88	...	100
Armenia	50	2.5	...	...	83	83	92	95	...	...	20
Austria	10	1.6	...	< 10	...	90	90	60	...	...	8 000
Azerbaijan	22	2.4	...	...	50	90	94	91	...	...	50
Belarus	37	1.7	...	...	94	90	91	96	...	...	200
Belgium	10	1.7	...	< 10	...	97	94	70	...	...	10 000
Bosnia and Herzegovina	...	1.6	...	...	85	67	69	57	...	...	750
Bulgaria	27	1.5	...	< 10	98	100	94	93	94	...	300
Croatia	...	1.7	...	< 10	97	87	87	90	...	...	300
Czech Republic	15	1.8	...	< 10	...	96	98	96	...	...	2 000
Denmark	9	1.7	...	< 10	...	89	100	88	...	...	4 000
Estonia	41	1.6	...	< 10	99	84	89	81	...	...	40

Member States[a]	Maternal mortality ratio (pregnancy-related) 1990	Total fertility rate 1995	Institutional delivery (per 100 live births) 1990	Underweight prevalence among preschool children (%) 1995	Immunization coverage (%) 1994[b]						HIV prevalence[c] (estimated number) 1994
					Children immunized by age 12 months					pregnant women	
					BCG	DPT 3	OPV 3	Measles[d]	HBV3	Tetanus toxoid 2[e]	
Finland	11	1.9	...	< 10	100	100	100	98	...	...	500
France	15	1.7	...	< 10	78	89	92	76	...	...	90 000
Georgia	33	2.1	...	...	30	58	82	63	...	...	500
Germany	22	1.3	...	< 10	...	80	80	75	...	...	43 000
Greece	10	1.4	99	< 10	50	78	95	70	2	...	5 000
Hungary	30	1.7	...	< 10	100	100	100	100	...	...	3 000
Iceland	0	2.2	...	< 10	...	98	99	98	...	...	200
Ireland	10	2.1	...	< 10	...	65	63	78	...	...	1 700
Israel	7	2.8	97	< 10	...	92	93	94	92	...	2 000
Italy	12	1.3	95	< 10	...	50	98	50	95	...	90 000
Kazakhstan	80	2.4	...	...	86	80	75	72	...	...	50
Kyrgyzstan	110	3.5	...	...	98	83	85	89	...	...	25
Latvia	40	1.6	...	...	100	65	70	85	3	...	100
Lithuania	36	1.8	...	...	97	96	89	94	...	...	200
Luxembourg	0	1.7	...	< 10	...	95	90	80	...	...	300
Malta	...	2.1	...	< 10	77	63	83	90	...	...	200
Netherlands	12	1.6	...	< 10	...	97	97	95	...	...	3 000
Norway	6	2.0	...	< 10	...	92	92	93	...	...	1 250
Poland	19	1.9	...	< 10	94	95	96	96	82	...	10 000
Portugal	15	1.6	...	< 10	94	93	95	94	6	...	8 000
Republic of Moldova	60	2.1	...	...	98	96	99	98	19	...	40
Romania	130	1.5	...	< 10	100	98	94	93	...	...	500
Russian Federation	75	1.5	...	< 10	96	72	88	91	...	...	3 000
Slovakia	...	1.9	...	...	98	99	98	99	...	...	250
Slovenia	13	1.5	...	...	99	98	98	91	...	...	150
Spain	7	1.2	...	< 10	...	88	88	90	45	...	120 000
Sweden	7	2.1	...	< 10	...	99[g]	99	96	...	...	3 000
Switzerland	6	1.6	...	< 10	...	89	95	83	...	...	12 000
Tajikistan	130	4.7	...	...	98	95	92	90	...	...	25
The Former Yugoslav Republic of Macedonia	...	2.0	...	...	90	87	96	85	34	...	500
Ukraine	50	1.6	...	...	92	94	95	96	...	...	1 500
United Kingdom	9	1.8	...	< 10	...	92	94	92	...	...	25 000
Uzbekistan	55	3.7	...	...	93	65	79	71	...	...	100
South-East Asia											
Democratic People's Republic of Korea	70	2.3	99	10–19	99	96	99	98	...	95	100
Sri Lanka	140	2.4	60	≥30	89	91	91	88	...	81	5 000
Thailand	200	2.1	45	10–19	98	93	93	86	57	86	700 000
Western Pacific											
Australia	9	1.9	...	< 10	...	95	72	86	...	...	11 000
Brunei Darussalam	60	2.9	...	20–29	100	100	100	100	100	50	300
China	95	2.0	45	10–19	94	93	94	89	...	11	10 000
Fiji	90	2.9	...	< 10	100	97	99	94	82	100	150
Japan	18	1.5	100	< 10	91	85	91	68	...	...	6 200
Malaysia	80	3.4	60	20–29	100	90	90	81	86	79	30 000
New Zealand	26	2.1	100	< 10	20	84	84	87	81	...	1 200
Philippines	280	3.8	25	≥30	91	85	86	86	...	48	18 000
Republic of Korea	130	1.8	90	10–19	93	93	93	92	...	...	2 000
Singapore	10	1.7	99	< 10	97	95	93	88	91	...	1 200
Solomon Islands	...	5.2	...	...	77	69	68	68	65	67	...
Vanuatu	280	4.5	...	...	86	74	74	53	69	10	...
Viet Nam	160	3.7	80	≥30	96	93	94	95	...	82	25 000
WHO Member States with values below all three health-for-all targets[f]											
Africa											
Angola	1500	6.9	15	20–29	40	21	23	32	...	14	48 000
Benin	990	6.9	20	20–29	91	79	79	72	...	77	27 000
Burkina Faso	930	6.3	30	20–29	78	47	47	55	...	39	300 000
Burundi	1300	6.5	20	≥30	69	57	54	44	...	30	75 000
Cameroon	550	5.5	60	10–19	62	48	50	31	...	13	175 000
Central African Republic	700	5.5	...	≥30	67	40	43	70	...	13	85 000
Chad	1 500	5.7	...	≥30	43	18	18	24	...	54	75 000

Member States[a]	Maternal mortality ratio (pregnancy-related) 1990	Total fertility rate 1995	Institutional delivery (per 100 live births) 1990	Underweight prevalence among preschool children (%) 1995	Immunization coverage (%) 1995[b]						HIV prevalence[c] (estimated number) 1994
					Children immunized by age 12 months					Pregnant women	
					BCG	DPT 3	OPV 3	Measles[d]	HBV3	Tetanus toxoid 2[e]	
Comoros	950	6.8	20	≥30	93	59	59	59	...	44	250
Congo	890	6.1	45	20–29	58	50	50	39	...	75	80 000
Côte d'Ivoire	810	7.1	40	20–29	48	40	40	57	...	22	390 000
Equatorial Guinea	820	5.7	...	20–29	99	64	64	61	...	63	2 000
Eritrea	1 400	5.6	...	≥30	57	45	45	45	...	21	50 000
Ethiopia	1 400	6.8	10	≥30	65	57	57	54	...	22	588 000
Gabon	500	5.5	80	10–19	68	48	48	50	...	13	13 000
Gambia	1 100	5.4	20	20–29	99	93	97	88	56	92	11 000
Ghana	740	5.7	40	20–29	85	71	71	68	...	22	172 000
Guinea	1 600	6.8	...	20–29	78	73	73	69	...	66	17 000
Guinea-Bissau	910	5.6	...	10–19	95	74	69	68	...	55	15 000
Kenya	650	6.0	40	20–29	92	84	84	73	...	72	1 000 000
Liberia	560	6.6	55	20–29	84	43	45	44	...	35	17 000
Madagascar	490	5.9	50	≥30	82	67	66	59	...	35	2 500
Malawi	560	6.9	50	20–29	98	98	98	99	...	76	650 000
Mali	1 200	6.9	...	20–29	75	46	46	49	...	19	58 000
Mauritania	930	5.2	20	≥30	93	50	50	53	...	27	7 000
Mozambique	1 500	6.3	25	≥30	78	57	57	71	...	36	400 000
Namibia	370	5.1	...	20–29	77	61	60	57	...	52	45 000
Niger	1 200	7.3	15	≥30	43	19	19	38	...	30	40 000
Nigeria	1 000	6.2	30	≥30	55	44	45	50	...	27	1 050 000
Rwanda	1 300	6.3	20	≥30	89	90	90	88	...	88	250 000
Senegal	1 200	5.8	40	20–29	90	80	80	80	...	39	50 000
Sierra Leone	1 800	6.3	20	≥30	60	41	41	44	...	61	60 000
Swaziland	560	4.7	50	10–19	100	96	96	94	...	75	15 000
Togo	640	6.3	10	20–29	81	73	71	65	...	43	150 000
Uganda	1 200	7.0	30	20–29	98	79	78	79	...	76	1 300 000
United Republic of Tanzania	770	5.7	55	≥30	86	79	78	75	...	31	840 000
Zaire	870	6.5	...	≥30	51	35	36	41	...	20	680 000
Zambia	940	5.7	50	20–29	90	76	75	78	...	53	700 000
Zimbabwe	570	4.8	65	10–19	90	80	80	78	...	59	900 000
Americas											
Bolivia	650	4.6	30	10–19	77	88	89	83	...	47	2 000
Haiti	1 000	4.7	20	≥30	48	30	30	24	...	23	150 000
Eastern Mediterranean											
Afghanistan	1 700	6.6	...	≥30	15	12	8	40	...	3	50
Djibouti	570	5.6	75	20–29	71	49	49	42	...	27	8 000
Somalia	1 600	6.8	2	≥30	31	18	18	30	...	5	10 000
Sudan	660	5.6	10	≥30	88	76	77	74	...	65	125 000
Yemen	1 400	7.4	10	≥30	54	52	52	49	...	27	750
South-East Asia											
Bangladesh	850	4.1	2	≥30	100	91	92	96	...	94	15 000
Bhutan	1 600	5.7	1	≥30	98	87	86	85	...	70	75
Myanmar	580	4.0	25	≥30	74	69	69	66	...	61	350 000
Nepal	1 500	5.2	4	≥30	85	77	78	78	...	19	5 000
Western Pacific											
Cambodia	900	5.1	...	≥30	95	79	80	75	...	36	90 000
Lao People's Democratic Republic	650	6.4	20	≥30	57	51	60	65	...	34	550
Papua New Guinea	930	4.8	45	≥30	78	50	55	35	17	31	4 000
Other WHO Member States											
Africa											
Lesotho	610	5.0	...	20–29	55	58	66	82	...	10	28 000
Sao Tome and Principe	...	...	...	*20–29*	*95*	*79*	*79*	*74*	...	*40*	...
Seychelles	...	...	...	*≥30*	*100*	*97*	*97*	*99*	*99*	*100*	...
South Africa	230	4.0	75	< 10	95	73	72	76	...	26	650 000

Member States[a]	Maternal mortality ratio (pregnancy-related) 1990	Total fertility rate 1995	Institutional delivery (per 100 live births) 1990	Underweight prevalence among preschool children (%) 1995	Immunization coverage (%) 1995[b] Children immunized by age 12 months BCG	DPT 3	OPV 3	Measles[d]	HBV3	Pregnant women Tetanus toxoid 2[e]	HIV prevalence[c] (estimated number) 1994
Americas											
Antigua and Barbuda	...	...	...	...	...	100	100	91	...	...	...
Brazil	220	2.8	70	< 10	90	69	95	78	...	62	550 000
Dominica	...	...	...	...	92	92	92	92	...	...	...
Grenada	...	...	...	...	...	83	85	93	...	...	...
Peru	280	3.3	45	< 10	95	94	92	97	...	21	30 000
Saint Kitts and Nevis	...	...	...	...	...	100	100	100	...	...	...
Saint Lucia	...	...	...	...	95	97	97	94	...	...	...
Saint Vincent and the Grenadines	...	...	...	...	100	100	100	100	...	...	...
Eastern Mediterranean											
Egypt	170	3.7	25	< 10	85	82	83	82	82	52	7 500
Iraq	310	5.5	15	10–19	99	91	91	95	59	72	250
Libyan Arab Jamahiriya	220	6.2	70	< 10	99	91	91	89	...	45	1 300
Morocco	610	3.4	25	< 10	99	93	93	92	...	64	5 000
Pakistan	340	5.9	15	≥30	65	55	55	53	...	39	40 000
Europe											
Monaco	...	...	...	...	90	99	99	98	...	...	...
San Marino	...	...	...	...	...	97	100	96	98	...	...
Turkey	180	3.2	60	10–19	90	86	86	75	...	38	500
Turkmenistan	55	3.8	...	...	97	87	94	90	...	...	25
Yugoslavia	...	...	...	...	...	...	...	...	...	...	...
South-East Asia											
India	570	3.6	20	≥30	97	92	92	84	...	81	1 750 000
Indonesia	650	2.8	30	≥30	95	91	91	89	14	64	50 000
Maldives	...	6.5	...	≥30	99	94	94	94	63	94	60
Western Pacific											
Cook Islands	...	...	...	...	96	93	93	96	86	68	...
Kiribati	...	...	...	< 10	60	100	100	96	75	96	...
Marshall Islands	...	...	...	...	96	67	62	59	46	15	...
Micronesia, Federated States of	...	...	...	...	50	83	81	90	82	44	...
Mongolia	65	3.4	99	10–19	94	88	86	85	89	...	150
Nauru	...	...	...	...	93	74	74	...	...	...	...
Niue	...	...	...	...	92	100	100	34	90	...	...
Palau	...	...	...	...	100	100	100	100	100	100	...
Samoa	35	4.3	...	...	98	95	95	98	96	96	...
Tonga	...	...	...	...	99	95	93	94	91	88	...
Tuvalu	...	...	...	...	88	87	92	94	49	52	...

[a] Italics indicate less populous Member States (under 150 000 population in 1990).

[b] Figures refer to BCG, diphtheria-pertussis-tetanus (third dose), oral poliovirus (third dose), measles, hepatitis B (third dose) and tetanus toxoid (second dose).

[c] Estimates only for countries with an adult population in 1994 of over 100 000.

[d] In some countries measles immunization is given at, or later than, 12 months and up to 2 years.

[e] TT boosters included or child protected at birth.

[f] The three targets in WHO's strategy for health for all by the year 2000 relating to health status are: life expectancy at birth above 60 years; under-5 mortality rate below 70 per 1 000 live births; infant mortality rate below 50 per 1 000 live births.

[g] DT only.

...Data not available or not applicable.

Table A3. Basic indicators

Estimates are obtained or derived from relevant WHO programmes or from responsible international agencies for the areas of their concern

Member States[a]	Reported cases of selected diseases during the specified year						% of population with access to		Adult literacy rate 1995		GNP per capita		Average annual external debt ratio (% GNP) 1991–93	Military expenditure (% GNP) 1993
	AIDS 1995	Tuberculosis 1994	Malaria 1993	Polio[b] 1995	Measles 1994	Neonatal tetanus 1994	safe water 1994–95 total	adequate sanitation 1994–95 total	Both sexes	Female	US $ 1993	Average annual growth (%) 1980–93		
WHO Member States with values above all three health-for-all targets[c]														
Africa														
Algeria	...	13 725	85	4	5 913	21	...	...	61.6	49.0	1 780	-0.8	63	3.0
Botswana	194	4 756	14 778	0	2 004	1	...	...	69.8	59.9	2 790	6.2	19	5.9
Cape Verde	...	...	...	0	30	2	...	...	71.6	63.8	920	3.0	47	...
Mauritius	...	149	...	0	10	0	...	...	82.9	78.8	3 030	5.5	34	0.4
Americas														
Argentina	686	13 683	758	0	86	9	...	...	96.2	96.2	7 220	-0.5	31	1.7
Bahamas	165	...	...	0	0	0	...	...	98.2	98.0	11 420	1.4	...	...
Barbados	49	...	...	0	0	0	...	...	97.4	96.8	6 230	0.5	39	0.5
Belize	...	59	8 586	0	0	...	82	57	...	...	2 450	2.9	38	1.1
Canada	489	...	394	0	503	...	...	...	...	...	19 970	1.4	...	2.0
Chile	114	...	2	0	0	1	96	71	95.2	95.0	3 170	3.6	51	2.4
Colombia	181	8 901	129 377	0	525	61	96	70	91.3	91.4	1 400	1.5	38	2.6
Costa Rica	112	325	5 033	0	7	0	100	99	94.8	95.0	2 150	1.1	62	...
Cuba	31	1 681	10	0	0	0	94	66	95.7	95.3	...	...	...	3.1
Dominican Republic	207	3 783	967	0	3	5	79	85	82.1	82.2	1 230	0.7	62	1.3
Ecuador	24	9 685	46 859	0	3 668	57	70	64	90.1	88.2	1 200	0.0	105	1.1
El Salvador	256	3 901	3 887	0	0	8	62	73	71.5	69.8	1 320	0.2	32	1.3
Guatemala	...	2 976	41 868	0	204	17	...	...	55.6	48.6	1 100	-1.2	28	1.0
Guyana	96	266	33 172	0	0	...	65	90	98.1	97.5	350	-3.0	776	...
Honduras	219	4 291	44 513	0	1	9	70	68	72.7	72.7	600	-0.3	122	1.4
Jamaica	286	109	6	0	0	0	...	...	85.0	89.1	1 440	-0.3	141	1.1
Mexico	3 406	16 353	15 793	0	108	81	87	70	89.6	87.4	3 610	-0.5	37	0.5
Nicaragua	9	2 750	44 037	0	3	4	...	...	65.7	66.6	340	-5.7	802	2.6
Panama	105	827	481	0	3	2	82	87	90.8	90.2	2 600	-0.7	114	0.0
Paraguay	9	1 850	436	0	122	18	...	...	92.1	90.6	1 510	-0.7	27	...
Suriname	20	53	...	0	...	...	...	...	93.0	91.0	1 180	-2.0	...	1.1
Trinidad and Tobago	149	129	8	0	0	0	...	...	97.9	97.0	3 830	-2.8	50	1.8
United States of America	37 509	24 361	1 074	0	958	0	...	...	...	...	24 740	1.7	...	4.7
Uruguay	101	666	...	0	...	0	34	...	97.3	97.7	3 830	-0.1	59	2.0
Venezuela	453	4 877	12 539	0	15 364	14	88	...	91.1	90.3	2 840	-0.7	65	1.8
Eastern Mediterranean														
Bahrain	8	...	258	0	0	0	...	...	85.2	79.4	8 030	-2.9	...	6.1
Cyprus	...	37	2	1	0	0	...	...	...	...	10 380	4.9	...	3.6
Iran, Islamic Republic of	7	...	64 581	90	506	21	...	...	68.6	59.3	...	...	15	3.5
Jordan	1	443	266	0	516	5	89	30	86.6	79.4	1 190	...	169	9.0
Kuwait	3	237	1 379	0	432	0	...	...	78.6	74.9	19 360	-4.3	...	13.3
Lebanon	8	940	4	1	51	3	...	...	92.4	90.3	...	...	25	3.4
Oman	7	304	16 873	0	163	0	56	72	...	...	4 850	3.4	32	21.5
Qatar	5	...	370	0	12	0	...	...	79.4	79.9	15 030	-7.2	...	...
Saudi Arabia	37	2 518	18 380	3	1 283	33	...	...	62.8	50.2	...	-3.6	...	15.8
Syrian Arab Republic	...	5 127	961	0	1 334	74	87	...	70.8	55.8	...	...	109	...
Tunisia	46	2 376	45	0	597	7	...	...	66.7	54.6	1 720	1.2	60	3.4
United Arab Emirates	...	426	3 735	0	518	0	...	...	79.2	79.8	21 430	-4.4	...	4.8
Europe														
Albania	2	707	...	0	3	...	...	...	...	...	340	-3.2	...	...
Armenia	...	753	...	3	149	0	...	...	...	...	660[d]	-4.2[d]	1	...
Austria	113	1 264	...	0	...	...	...	...	...	...	23 510	2.0	...	1.0
Azerbaijan	1	2 839	...	5	6 138	...	...	...	...	...	730	-3.5	1	4.6
Belarus	2	4 348	...	0	685	...	...	...	99.5	99.4	2 870[d]	2.4[d]	2	...
Belgium	73	1 521	320	0	...	...	...	...	...	...	21 650	1.9	...	1.8
Bosnia and Herzegovina	...	1 595	...	0	...	...	...	...	...	...	...	...	...	...
Bulgaria	1	5 296	...	0	73	...	...	...	...	...	1 140	0.5	122	3.2
Croatia	12	2 217	...	0	138	1	...	...	...	...	...	...	...	9.1

Member States[a]	Reported cases of selected diseases during the specified year						% of population with access to		Adult literacy rate 1995		GNP per capita		Average annual external debt ratio (% GNP) 1991–93	Military expenditure (% GNP) 1993
	AIDS 1995	Tuberculosis 1994	Malaria 1993	Polio[b] 1995	Measles 1994	Neonatal tetanus 1994	safe water 1994–95 total	adequate sanitation 1994–95 total	Both sexes	Female	US $ 1993	Average annual growth (%) 1980–93		
Czech Republic	10	1 960	...	0	9	0	...	...	...	...	2 710	...	27	2.6
Denmark	151	494	...	0	18	...	...	...	...	...	26 730	2.0	...	2.0
Estonia	2	645	...	0	230	0	...	...	99.8	99.8	3 080 [d]	-2.2 [d]	2	4.4
Finland	25	539	...	0	...	...	...	...	...	...	19 300	1.5	...	2.2
France	2 453	9 093	...	0	...	...	...	...	...	...	22 490	1.6	...	3.4
Georgia	...	...	...	0	136	...	...	...	99.6	99.4	580 [d]	-6.6 [d]	6	...
Germany	637	12 982	...	0	...	0	...	...	...	...	23 560	2.1 [e]	...	2.2
Greece	115	...	...	0	87	...	...	...	96.7	95.3	7 390	0.9	...	5.5
Hungary	24	4 163	...	0	11	0	...	...	99.2	99.0	3 350	1.2	67	2.0
Iceland	2	18	...	0	...	...	...	...	...	...	24 950	1.2	...	0.0
Ireland	14	...	...	0	775	...	...	...	...	...	13 000	3.6	...	1.3
Israel	23	395	58	0	1 574	...	...	...	...	...	13 920	2.0	...	9.1
Italy	3 231	5 816	...	0	5 082	0	...	...	98.1	97.6	19 840	2.1	...	2.1
Kazakhstan	...	10 519	...	1	1 787	...	...	...	...	...	1 560 [d]	-1.6 [d]	3	0.5
Kyrgyzstan	...	2 726	...	0	186	0	...	...	...	...	850 [d]	0.1 [d]	7	0.5
Latvia	...	1 470	...	0	10	0	...	...	...	...	2 010 [d]	-0.6 [d]	2	0.9
Lithuania	1	2 135	...	0	286	0	...	...	99.5	99.3	1 320 [d]	-2.8 [d]	2	5.5
Luxembourg	10	33	...	0	0	0	...	...	...	...	37 320	2.8	...	0.8
Malta	1	...	...	0	5	...	...	...	...	...	7 970	3.2	25	...
Netherlands	241	1 811	223	0	302	0	...	...	...	...	20 950	1.7	...	2.4
Norway	37	242	...	0	4	...	...	...	...	...	25 970	2.2	...	3.1
Poland	53	16 653	...	0	864	...	...	...	99.7	99.7	2 260	0.4	60	2.2
Portugal	249	5 619	...	0	3 038	...	...	...	89.6	87.0	9 130	3.3	43	3.0
Republic of Moldova	2	2 626	...	0	3 951	0	...	...	98.9	...	1 060 [d]	-2.0 [d]	2	...
Romania	393	21 422	...	0	6 228	...	...	...	97.9	96.9	1 140	-2.4	13	2.5
Russian Federation	21	70 822	...	152	28 672	0	...	...	99.5	99.4	2 340 [d]	-1.0 [d]	19	14.6
Slovakia	2	1 760	...	0	29	0	...	...	...	...	1 950	...	28	2.4
Slovenia	10	526	...	0	60	...	...	...	...	...	6 490	...	18	1.3
Spain	2 901	...	...	0	3 300	...	...	...	97.1	96.1	13 590	2.7	...	1.8
Sweden	116	537	...	0	0	...	...	...	...	...	24 740	1.3	...	2.8
Switzerland	188	924	...	0	77	0	...	...	...	...	35 760	1.1	...	1.7
Tajikistan	0	892	...	0	429	...	...	...	...	...	470 [d]	-3.6 [d]	1	...
The Former Yugoslav Republic of Macedonia	...	728	...	0	229	0	...	...	...	...	820	...	...	...
Ukraine	16	20 622	...	1	...	...	...	...	98.8	...	2 210 [d]	0.2 [d]	2	...
United Kingdom	718	6 196	1 922	0	23 525	...	...	...	...	...	18 060	2.3	...	3.6
Uzbekistan	...	14 890	...	1	...	...	...	...	...	...	970 [d]	-0.2 [d]	2	...
South-East Asia														
Democratic People's Republic of Korea	0	...	...	7	0	...	...	...	...	...	...	...	...	...
Sri Lanka	11	6 372	363 200	0	200	5	57	66	90.2	87.2	600	2.7	68	4.8
Thailand	3 379	47 767	115 220	1	38 336	62	...	...	93.8	91.6	2 110	6.4	38	2.9
Western Pacific														
Australia	110	1 020	...	0	...	0	...	...	...	...	17 500	1.6	...	2.6
Brunei Darussalam	...	...	21	0	...	...	...	...	88.2	83.4	...	...	...	...
China	12	363 804	68 594	91	76 204	...	46	...	81.5	72.7	490 [f]	8.2	19	2.7
Fiji	...	280	...	0	...	...	77	...	91.6	89.3	2 130	0.5	22	1.6
Japan	173	44 590	...	0	...	...	...	...	...	...	31 490	3.4	...	1.0
Malaysia	70	11 708	39 890	0	346	9	...	...	83.5	78.1	3 140	3.5	38	4.3
New Zealand	28	352	...	0	33	0	...	...	...	...	12 600	0.7	...	1.5
Philippines	37	180 044	64 974	4	3 006	336	84	75	94.6	94.3	850	-0.6	64	2.2
Republic of Korea	5	38 155	...	0	7 883	...	...	...	98.0	96.7	7 660	8.2	14	3.6
Singapore	22	1 677	354	0	159	...	...	...	91.1	86.3	19 850	6.1	...	4.8
Solomon Islands	0	332	126 123	0	406	0	...	...	...	...	740	2.6	45	...
Vanuatu	0	152	10 377	0	0	0	...	...	...	...	1 230	0.5	39	...
Viet Nam	79	51 763	156 069	104	11 853	422	38	21	93.7	91.2	170	...	217	...
WHO Member States with values below all three health-for-all targets[c]														
Africa														
Angola	35	7 157	...	4	5 480	814	32	16	...	...	...	...	81	...
Benin	...	2 119	...	7	5 963	76	...	...	37.0	25.8	430	-0.4	69	1.2

Member States[a]	Reported cases of selected diseases during the specified year						% of population with access to		Adult literacy rate 1995		GNP per capita		Average annual external debt ratio (% GNP) 1991–93	Military expenditure (% GNP) 1993
	AIDS 1995	Tuberculosis 1994	Malaria 1993	Polio[b] 1995	Measles 1994	Neonatal tetanus 1994	safe water 1994–95 total	adequate sanitation 1994–95 total	Both sexes	Female	US $ 1993	Average annual growth (%) 1980–93		
Burkina Faso	...	...	...	12	2 824	19	...	14	19.2	9.2	300	0.8	37	2.2
Burundi	...	3 840	...	0	7 192	26	...	...	35.3	22.5	180	0.9	95	2.1
Cameroon	...	7 312	...	2	1 548	69	...	...	63.4	52.1	820	-2.2	65	2.1
Central African Republic	173	...	...	4	...	8	...	...	60.0	52.4	400	-1.6	68	...
Chad	592	...	...	192	9 373	614	29	32	48.1	34.7	210	3.2	56	...
Comoros	...	494	...	0	2	9	...	...	57.3	50.4	560	-0.4	69	...
Congo	...	3 080	...	0	226	8	...	...	74.9	67.2	950	-0.3	213	5.8
Côte d'Ivoire	...	...	...	87	...	...	...	54	40.1	30.0	630	-4.6	223	...
Equatorial Guinea	98	356	...	0	270	5	...	50	78.5	68.1	420	1.2	185	...
Eritrea	370	...	...	10	541	...	...	...	...	...	...	...	...	...
Ethiopia	3 867	99 329	...	199	1 133	...	...	...	35.5	25.3	100	...	77	4.4
Gabon	265	1 034	...	...	...	...	...	...	63.2	53.3	4 960	-1.6	81	...
Gambia	42	...	...	0	...	...	61	34	38.6	24.9	350	-0.2	111	0.7
Ghana	904	8 894	...	28	34 821	128	56	42	64.5	53.5	430	0.1	67	...
Guinea	133	3 241	...	26	437	16	49	6	35.9	21.9	500	...	94	...
Guinea-Bissau	...	1 647	158 748	0	378	18	57	20	54.9	42.5	240	2.8	302	...
Kenya	637	22 930	...	12	4 180	50	...	...	78.1	70.0	270	0.3	103	3.5
Liberia	...	1 764	...	0	571	59	40	24	38.3	22.4	...	...	158	...
Madagascar	4	10 671	...	5	14 164	6	32	17	...	...	220	-2.6	158	1.1
Malawi	3 386	...	...	0	2 164	14	54	63	56.4	41.8	200	-1.2	87	1.0
Mali	...	3 076	295 737	26	2 183	18	44	44	31.0	23.1	270	-1.0	101	2.2
Mauritania	16	...	...	1	2 668	4	...	...	37.7	26.3	500	-0.8	213	4.1
Mozambique	455	27 885	...	0	9 618	56	28	23	40.1	23.3	90	-1.5	424	7.6
Namibia	...	...	...	28	133	9	...	...	...	...	1 820	0.7	...	2.3
Niger	...	3 784	...	40	48 685	28	57	15	13.6	6.6	270	-4.1	73	1.5
Nigeria	...	8 449	...	92	95 915	419	43	38	57.1	47.3	300	-0.1	106	0.6
Rwanda	...	...	...	1	5 999	0	...	...	60.5	51.6	210	-1.2	56	9.0
Senegal	128	6 913	...	0	5 944	24	...	...	33.1	23.2	750	0.0	64	2.4
Sierra Leone	29	2 564	...	0	114	53	...	...	31.4	18.2	150	-1.5	207	2.2
Swaziland	58	...	...	0	610	0	...	...	76.7	75.6	1 190	2.3	27	2.4
Togo	853	1 137	...	5	4 721	16	67	20	51.7	37.0	340	-2.1	92	3.9
Uganda	...	26 994	...	85	46 192	494	...	60	61.8	50.2	180	...	92	1.4
United Republic of Tanzania	...	34 799	1 243 217	17	3 558	25	...	...	67.8	56.8	90	0.1	273	3.8
Zaire	...	...	...	475	12 573	306	25	9	77.3	67.7	...	...	169	...
Zambia	...	...	...	6	13 352	4	47	42	78.2	71.3	380	-3.1	239	1.9
Zimbabwe	2 746	...	877 734	0	...	...	...	...	85.1	79.9	520	-0.3	69	4.3
Americas														
Bolivia	4	9 431	27 475	0	719	21	60	...	83.1	76.0	760	-0.7	83	2.4
Haiti	...	...	853	0	...	...	28	24	45.0	42.2	...	...	26	...
Eastern Mediterranean														
Afghanistan	...	...	...	...	...	...	10	8	31.5	15.0	...	...	...	...
Djibouti	119	3 311	1 007	0	...	...	...	...	46.2	32.7	780	...	45	6.0
Somalia	...	2 023	3 049	...	...	...	...	...	...	...	...	...	301	...
Sudan	174	...	...	22	963	70	...	...	46.1	34.6	...	...	193	...
Yemen	9	11 464	39 396	46	35	3	...	...	...	...	...	...	70	...
South-East Asia														
Bangladesh	6	48 274	125 402	207	9 343	469	83	30	38.1	26.1	220	2.1	56	1.4
Bhutan	0	1 159	28 116	0	680	1	21	22	42.2	28.1	...	...	35	0.5
Myanmar	185	15 583	113 000	18	1 855	48	39	42	83.1	77.7	...	...	15	...
Nepal	16	15 572	16 380	2	775	4	48	22	27.5	14.0	190	2.0	62	1.4
Western Pacific														
Cambodia	76	15 172	99 189	98	946	147	...	...	...	...	...	...	20	3.3
Lao People's Democratic Republic	3	1 135	41 787	11	1 385	10	41	30	56.6	44.4	280	...	163	7.9
Papua New Guinea	32	5 335	66 797	0	6 821	159	...	26	72.2	62.7	1 130	0.6	80	1.8

Member States[a]	Reported cases of selected diseases during the specified year						% of population with access to		Adult literacy rate 1995		GNP per capita		Average annual external debt ratio (% GNP) 1991–93	Military expenditure (% GNP) 1993
	AIDS 1995	Tuberculosis 1994	Malaria 1993	Polio[b] 1995	Measles 1994	Neonatal tetanus 1994	safe water 1994–95 total	adequate sanitation 1994–95 total	Both sexes	Female	US $ 1993	Average annual growth (%) 1980–93		
Other WHO Member States														
Africa														
Lesotho	...	4 334	...	0	573	0	57	35	71.3	62.3	650	-0.5	41	...
Sao Tome and Principe	*4*	...	...	*0*	*319*	*3*	...	...	...	...	*350*	*-3.6*	*558*	...
Seychelles	...	...	...	*0*	*0*	*0*	...	...	...	...	*6 280*	*3.4*	*44*	...
South Africa	1 120	90 292	...	0	3 390	19	...	46	81.8	81.7	2 980	-0.2	...	2.7
Americas														
Antigua and Barbuda	*1*	...	...	*0*	*0*	*0*	*95*	...	...	...	*6 540*	*5.2*	...	...
Brazil	2 698	87 280	466 190	0	35	151	...	...	83.3	83.2	2 930	0.3	28	1.1
Dominica	...	*12*	...	*0*	*0*	...	...	...	...	...	*2 720*	*4.6*	*51*	...
Grenada	...	*3*	...	*0*	*0*	...	...	...	...	...	*2 380*	*3.8*	*58*	...
Peru	189	48 601	95 222	0	665	129	60	47	88.7	83.0	1 490	-2.7	63	1.8
Saint Kitts and Nevis	*2*	*2*	...	*0*	*0*	...	...	...	...	...	*4 410*	*5.4*	*25*	...
Saint Lucia	*7*	*24*	...	*0*	*0*	...	...	...	...	...	*3 380*	*4.4*	*21*	...
Saint Vincent and the Grenadines	*5*	*0*	...	*0*	*0*	...	...	...	...	...	*2 120*	*5.0*	*33*	...
Eastern Mediterranean														
Egypt	7	3 911	17	47	1 444	993	...	...	51.4	38.8	660	2.8	117	4.3
Iraq	6	...	49 823	34	10 657	89	45	36	58.0	45.0	...	...	...	...
Libyan Arab Jamahiriya	...	...	136	0	...	...	30	18	76.2	63.0	...	...	...	5.1
Morocco	31	30 316	198	0	3 512	9	...	...	43.7	31.0	1 040	1.2	80	4.5
Pakistan	6	...	92 634	460	1 421	1 842	60	30	37.8	24.4	430	3.1	49	6.4
Europe														
Monaco	*3*	*1*	...	...	...	...	...	...	...	...	...	...	...	...
San Marino	...	*2*	...	*0*	...	...	...	...	...	...	...	...	...	...
Turkey	8	...	47 156	28	21 995	...	...	...	82.3	72.4	2 970	2.4	51	5.8
Turkmenistan	...	...	...	8	2 552	...	...	...	...	...	...	...	0	...
Yugoslavia	...	...	...	...	...	...	...	...	...	...	...	...	...	...
South-East Asia														
India	1 210	1 114 374	2 207 431	2 993	48 607	2 285	63	29	52.0	37.7	300	3.0	36	3.3
Indonesia	22	49 647	140 559	21	6 798	45	63	...	83.8	78.0	740	4.2	67	1.5
Maldives	1	249	29	0	2	0	88	40	93.2	93.0	820	7.2	62	...
Western Pacific														
Cook Islands	...	*4*	...	*0*	*0*	*0*	...	...	...	...	...	...	...	...
Kiribati	*0*	*253*	...	*0*	*299*	*0*	*99*	*100*	...	...	*710*	*0.5*	...	...
Marshall Islands	...	...	...	*0*	*0*	*0*	...	...	...	...	...	...	...	...
Micronesia, Federated States of	...	*173*	...	*0*	*905*	*0*	...	...	...	...	...	...	...	...
Mongolia	0	1 730	...	0	177	4	...	...	82.9	77.2	390	0.2	33	...
Nauru	*0*	*4*	...	*0*	...	...	...	...	...	...	...	...	...	...
Niue	*0*	*2*	...	*0*	*2*	*0*	*100*	*100*	...	...	...	...	...	...
Palau	...	...	...	*0*	*0*	*0*	...	...	...	...	...	...	...	...
Samoa	1	45	...	0	0	0	...	...	...	...	950	...	100	...
Tonga	...	*23*	...	*0*	...	*0*	*100*	*100*	...	...	*1 530*	*0.6*	*31*	...
Tuvalu	...	*19*	...	*0*	*0*	*0*	*100*	*85*	...	...	...	...	...	...

---

[a] Italics indicate less populous Member States (under 150 000 population in 1990).

[b] Totals exclude vaccine-associated and imported cases.

[c] The three targets in WHO's strategy for health for all by the year 2000 relating to health status are: life expectancy at birth above 60 years; under-5 mortality rate below 70 per 1 000 live births; infant mortality rate below 50 per 1 000 live births.

[d] Estimates for republics of former USSR should be regarded as preliminary.

[e] Data refer to the Federal Republic of Germany before unification.

[f] Preliminary estimate.

... Data not available or not applicable.

Table B. Analytical tabulations

Indicator	Year	Unit	WHO Member States	Developed world			Developing world		
				Total	Developed market economies	Economies in transition	Total	Developing countries other than LDCs	Least developed countries (LDCs)
Population	1995	millions	5 701	1 214	823	391	4 487	3 898	589
Growth rate per annum	1990–1995	%	1.6	0.5	0.6	0.2	1.9	1.8	2.9
Population under 15 years	1995	millions	1 799	249	157	92	1 550	1 292	257
Percentage of total population	1995	...	32	21	19	24	35	33	44
Growth rate per annum	1990–1995	%	1.1	-0.4	0.1	-1.1	1.4	1.1	2.7
Population aged 65 years and above	1995	millions	370	159	115	44	211	193	18
Percentage of total population	1995	...	6	13	14	11	5	5	3
Growth rate per annum	1990–1995	%	2.6	2	1.6	2.9	3.2	3.2	2.8
Elderly support ratio (65+/20–64)	1995	%	12	22	23	19	9.2	9.5	7
Population in urban areas	1995	millions	2 572	895	636	260	1 677	1 544	133
Percentage of total population	1995	...	45	74	77	66	37	40	23
Growth rate per annum	1990–1995	%	2.6	0.8	0.8	0.7	3.6	3.5	5.3
% in megacities (≥ 8 million)	1995	%	11	9	12	4	11	12	0
Life expectancy at birth	1995	years	65	75	77	69	64	66	52
Life expectancy at birth, female advantage	1995	years	4	7.3	6.4	9.7	2.8	3	2
Adult literacy rate, both sexes	1995	%	77	99	...	...	70	73	49
Adult literacy rate, females	1995	%	71	98	...	...	62	64	38
Crude death rate	1995	per 1 000 population	9.1	10	9.3	11.4	8.8	8	14.4
Age and sex standardized death rate	1990–1995	per 100 000 population	938	573	474	803	1 051	956	1 668
Age-specific death rates:									
5–19	1990–1995	per 100 000 population	218	53	37	79	249	191	589
20–64, males	1990–1995	per 100 000 population	594	588	426	948	596	553	967
20–64, females	1990–1995	per 100 000 population	412	279	227	390	458	408	856
65 years and above	1990–1995	per 100 000 population	6 196	5 637	5 285	6 604	6 632	6 541	7 614
Under-5 mortality rate	1995	per 1 000 live births	82	16	9	29	91	75	156
Infant mortality rate	1995	per 1 000 live births	60	13	7	24	67	57	106
Perinatal mortality	1995	per 1 000 live births	53	14	8	25	58	51	83
Neonatal mortality	1995	per 1 000 live births	36	9	5	16	40	36	53
Maternal mortality ratio (pregnancy-related)	1990	per 100 000 live births	430	30	13	60	480	350	1 050
Total fertility rate	1995	per woman	3	1.8	1.7	1.9	3.4	3.1	5.6
Institutional delivery	1990	% live births	44	97	98	95	37	41	20
Unsafe abortion	1990	per 1 000 15–49 women	14	7	1	22	17	15	26
Anaemia in pregnant women	1990	% pregnant women	51	18	18	16	56	57	52
Underweight prevalence among preschool children	1995	% children aged under 5	28	2.9	2.3	4.2	31	29	40
Immunization coverage: BCG[a]	1995	% children by 12 months	88	90	84	92	88	91	75
Immunization coverage: DPT3	1995	% children by 12 months	81	87	88	83	81	85	63
Immunization coverage: OPV3	1995	% children by 12 months	83	88	88	89	82	86	63
Immunization coverage: measles	1995	% children by 12 months	80	85	83	89	79	82	66
Immunization coverage: HBV3	1995	% children by 12 months	6	8	7	11	6	7	0.2
Immunization coverage: tetanus toxoid 2[b]	1995	% pregnant women	...	...	...	...	48	49	46
HIV prevalence rate among adults (estimates)	1994	per 100 000 adults	585	194	279	11	691	422	2 742
HIV/tuberculosis co-infection among adults (estimates)	1994	% HIV infected adults	43	11	11	17	45	43	48
Access to safe water	1995	%	...	...	...	...	75	...	...
Access to adequate sanitation	1995	%	...	...	...	...	34	...	...
Gross national product (GNP) per capita	1993	US$	4 554	16 407	23 262	1 992	965	1 043	210
External debt/GNP ratio	1991–1993 average	%	38	23	...	23	41	40	86
Public education expenditure as % of GNP	1992	...	5.1	5.3	...	...	4.1	...	...
Military expenditure as % of GNP	1993	...	3.3	3.4	2.9	9.3	3.1	3.1	2.3
Military expenditure per capita	1993	US$	160	605	651	465	41	45	7

[a] Only countries which recommend BCG immunization routinely for infants aged <1 are taken into consideration.

[b] Developing countries only.

...Data not available or not applicable.

Index

Main references are in bold type

Acquired immune deficiency syndrome, *see* AIDS/HIV infection
Administration, general 91
Adolescents **74-75**
Adults **75-79**
Advisory Committee for Health Research 85
Afghanistan 14, 50, 90, 96
Africa 12, **92-93**
  Africa 2000 initiative 64
  coordination in 88-89
  disease control 54, 56, 66-67, 68-69, 71-72
  infectious diseases 8, 32, 38, 48, 52-53
  polio eradication 71, 92
African Development Bank 89, 93
African Economic Community 88-89
African Programme for Onchocerciasis Control (APOC) 56, 70
Aging
  healthy 78-79
  population 105, 106
Agreement on the Application of Scnitary and Phytosanitary Measures 68
AIDS/HIV infection 7, 8, 15, 16, **31-33**, 95
  cancer and 59
  impact 2, 24
  leishmaniasis co-infection 50, 51
  in migrants 4
  prevention 32, 36-37, 66, 74, 101
  tuberculosis co-infection 27-28
  vaccine development 66
  World AIDS Day 1995 66
Airborne diseases **23-30**
Air pollution, urban 79-80
Albania 90, 98
Algeria 92
Alma-Ata declaration (1978) 63, 64, 82
Americas **94-95**
  disease eradication 71, 72, 94
  infectious diseases 8, 32, 48-49, 52, 53
Anaemia
  iron deficiency 43
  nutritional 100
Angola 51, 70, 89, 92
Animal-borne diseases 8, 24, **56-58**
  prevention and control 57-58
Animals
  control of reservoir 55, 56
  farm, antimicrobial use 19, 20, 107
Antigua and Barbuda 94
Antimicrobial drugs
  adequate provision 25
  proper use 106
  resistance 1, 4, 8, 17, **18-22**, 100, 107
    control 21-22
    costs 7
    examples 19-20
    hospital-acquired infections 22
    outlook 20-21
    surveillance 21, 64-65
  use in farm animals 19, 20, 107
Anxiety 77
Arbovirus infections 8
Argentina 16, 53, 56, 71, 94
Armenia 98
Artemether 69
Ascariasis (roundworms) 8, 24, 43, 105
Asia, infectious diseases 28, 32, 49, 53
Asian Development Bank 89
Associate Members 114, 115
Australia 5, 59, 66, 80, 83, 102, 103
  infectious diseases 15, 31
Austria 98
Azerbaijan 98

Bahamas 94
Bahrain 96, 97
Bangladesh 38, 50, 73, 90, 100, 101
  disease control 68, 70, 100, 101
Barbados 94
Basic minimum needs (BMN) programmes 97
Bednets, insecticide-treated 54, 70
Belarus 98
Belgium 98
Belize 94
Benin 92
Bhutan 100, 101
Bilharziasis, *see* Schistosomiasis
Bladder cancer 59, 61
Blindness (*see also* Trachoma) 31, 78
  river, *see* Onchocerciasis
Bloodborne infections **33-35**
Bolivia 48, 50, 53, 81, 94
  disease control 44, 56, 71
Borneo 41
Bosnia and Herzegovina 98, 99
Botswana 31, 53, 67, 92
Bovine spongiform encephalopathy 8, 15, 17
Brazil 39, 94
  disease control 56, 70, 71
  emerging diseases 15, 16
  HIV infection 31, 51
  insect-borne diseases 47, 48, 50, 51, 52, 53
Brazilian haemorrhagic fever 15
Breast-feeding 73
Bridge (newsletter) 81
Brucellosis 8, **57**, 58, 105
Brunei Darussalam 102
Bulgaria 98, 99
Burkina Faso 7, 83, 89, 92
Burkitt's lymphoma 59, 61
Burundi 38, 69, 89, 90, 92

Cambodia 71, 102, 103
Cameroon 12, 51, 52, 92
Campylobacteriosis 38, 41
Canada 5, 80, 94, 95
Cancer 2, 76-77
  infectious diseases and **59-62**
Cape Verde 89, 92, 93
Cardiovascular diseases 75-76
CDC (Centers for Disease Control and Prevention); *see* United States of America
Central African Republic 51, 52, 92
Centre for Environmental Health Activities (CEHA) 97
Cervical cancer 59, 60, 61, 76-77
Chad 7, 40, 51, 52, 92
Chagas disease (American trypanosomiasis) 8, 24, 46, **53**, 110
  control 56, 71
Chancroid 24
Changing medical education and medical practice (newsletter) 81
Chemical safety 84
Chernobyl disaster 84
Child health dialogue (newsletter) 74
Children 15
  airborne/droplet-transmitted diseases 23-25
  direct contact diseases **30-31**
  health **71-74**, 95
  immunization 71-72, 108
  mortality 13, **14-15**, 71
    in regions 93, 95, 97, 99, 101, 103
  school-age **74-75**
  sick, integrated management 72, 73, 108
  street 74
  underweight 73
  World Summit (1990) 71, 79
Chile 53, 56, 71, 94
China 11, 12, 62, 80, 90, 102, 103
  disease control 30, 31, 58, 69
  emerging diseases 16, 17
  food and waterborne diseases 38, 41, 42
  insect-borne diseases 53, 69
Chlamydial infection (*see also Trichomonas*) 33
Cholera 2, 8, 15, 18, 24, 38
  prevention and control 44-45, 66-67

  regional reports 94, 101, 102, 105
  vaccine 67, 111
Cities 10-11, 23, 105
  air pollution in 79-80
  health in 79-80, 97
Climate change 4, 6, 47
Codex Alimentarius Commission 68
COL-1492 66
Colombia 12, 52, 54, 56, 94
Communicable diseases, *see* Infectious diseases
Comoros 92
Condoms 11-12, 32, 33, 37, 66
Congenital malformations 76
Congo 7, 16, 51, 92
Contraception **11-12**
Cook Islands 102
Coordination **88-91**
Costa Rica 94
Costs
  of AIDS 32
  of infectious diseases 4, 7
Côte d'Ivoire 7, 16, 92
Cretinism 72
Crimean-Congo haemorrhagic fever 18, 96
Croatia 98
Cryptosporidiosis (*Cryptosporidium parvum*) 15, 18, 38
Cuba 48, 94
Cycle of infection 23
Cyprus 96
Czech Republic 98

Data Management and Mapping for Public Health, WHO/UNICEF joint programme 67
Democratic People's Republic of Korea 90, 100, 101
Dengue fever 8, 18, **48**, 95, 102
  prevention and control 53, 69
  vaccine 54, 101, 111
Dengue haemorrhagic fever (DHF) 8, 18, 24, **48**, 69, 95, 96
Denmark 98
  International Development Agency 80
Depression 77
Diabetes 76
Diarrhoeal diseases 2, 8, 24, **38-39**, 95, 100
  prevention and control 44, 66-67, 72, 111
Diethylcarbamazine (DEC) 55, 69
Diphtheria 8, 17, 18, 24, **26-27**
  prevention and control 36, 65
  regional reports 98, 100, 102
Diphtheria-pertussis-tetanus (DPT) vaccine 27, 46
Directory of health services and systems research centres 81
Directory of training programmes in health services research 81
Disability 78
Disasters, natural 90, 100
Displaced persons 3, 4, 6-7
Djibouti 67, 96
Dominica 94
Dominican Republic 94
Donors, aid 83
Dracunculiasis (guinea-worm disease) 7, 8, 24, **39-40**, 100
  prevention 45, 67, 97
Droplet transmission **23-30**
Drug abuse 75
Drugs
  antimicrobial, *see* Antimicrobial drugs
  essential 68, 83-84, 93, 97
  local production 97
  over-the-counter 19
  quality standards 83-84
  rational use **21-22**
Dysentery, bacillary (shigellosis) 8, 20, 38, 105
  prevention and control 66-67
  vaccine 67, 111

Eastern Mediterranean 8, 71, **96-97**
Ebola haemorrhagic fever 8, 15, 16, 18, 57, 64
Economic development projects 83
Economics, global 1-2, **5-6**
Ecuador 52, 94
Edna McConnell Clark Foundation 78
Education **7-9**, 74
  birth rates and 11, 12
  health 80
  medical 81
Eflornithine (DFMO) 55
Egypt 12, 39, 41, 67, 96, 97
Elderly **75-79**
Elephantiasis, *see* Filariasis, lymphatic
El Salvador 94
Emergency relief 89-90
Enterococci 19
Environmental health **79-80**, 84, 97, 99
EPICENTRE Groupe Européen d'Expertise en Epidémiologie pratique 66
Epidemics, responses to **17-18**, 64, 110-111
Epidemiological information 86
Epidemiological transition 101
Epstein-Barr virus 59, 62
Equatorial Guinea 92
Eritrea 67, 69, 92
Escherichia coli 38, 105, 111
  drug resistance 20
  strain O157:H7 8, 15, 16, **41**, 42
Estonia 98
Ethics, health 97
Ethiopia 26, 51, 67, 68-69, 73, 92
EUROHEALTH programme 98
Europe 12, 80, **98-99**
  infectious diseases 8, 28, 58, 71
European Union 83, 99
Expanded Programme on Immunization 30, 49, 54, 100

Family planning **11-12**
FAO 58, 68, 76
Fellowships programme 81, 82
Fertility **11**
Fiji 102
Filariasis, lymphatic 8, 24, 46
  control 55, 69
Financing
  health care 81, 97, 99
  WHO 91
Finland 98
Flea control 56
Food
  safety 67-68
  trade 3-4
Food and Agriculture Organization of the United Nations (FAO) 58, 68, 76
Foodborne diseases 7, 8, 24, 37, **40-42**, 105
  new and emerging 16
  prevention and control **43-46**, **66-68**, 106
France 31, 95, 98

Gabon 92
Gambia 73, 74, 92
General Agreement on Tariffs and Trade (GATT) 83
General Agreement on Trade in Service 68
Georgia 98
Germany 95, 98
Ghana 48, 67, 69, 92
Giardiasis 8, 38, 44, 105
Global Project of Antituberculosis Drug Resistance Surveillance 21
Goitre 72
Gonorrhoea (*Neisseria gonorrhoeae*) 20, 24, 33
Good manufacturing practices 83-84
Greece 98
"Greenhouse effect" 6
Grenada 94
Guatemala 12, 52, 83, 94
Guinea 67, 83, 92
Guinea-Bissau 51, 92
Guinea-worm disease, *see* Dracunculiasis
Guyana 94

Habitats, human **10-11**
Haemoglobinopathies 76
Haemophilus influenzae 19-20, 25, 73
Haiti 94
Hantaan virus disease 8, 15
Hantavirus pulmonary syndrome 16, 18
Health for all by the year 2000 63, 64
  renewing 82
Health care
  financing 81, 97, 99
  quality of 80-81, 93
  wastes 80
Health education 80
Health information 85-87
Health insurance 81
Health policy **82-88**
Health promotion 80, 97
Health systems/services 3, **80-91**
  coordination **88-91**
  infrastructure 64, **80-82**
  reform 80, 95, 97, 99, 103
  research 81
Health technology 64, 85
Healthy Cities movement 79, 97
"Healthy islands" concept 102
Hearing impairment 78
Heat-related mortality 6
Helicobacter pylori 59, 77
Hepatitis
  non-A, non-B 35

  - viral 2, 17, **33-35**, 96
- Hepatitis A 8, 41-42, 105
  - vaccine 45
- Hepatitis B 2, 7, 8, 24, **33-35**
  - liver cancer and 59
  - transmission 23, 33-34
  - vaccine 37
- Hepatitis C 2, 8, 15, 34, 35, 96
  - liver cancer and 59
  - prevention 37
- Hepatitis D 15
- Hepatitis E 8, 40, 41
- Hereditary diseases 76
- HIV infection, *see* AIDS/HIV infection
- Hodgkin's disease 61, 62
- Honduras 94
- Hookworm disease 8, 24, 43, 46
- Hospital infections 8, **22-23**
- Housing 10-11
- Human habitats **10-11**
- Human papilloma viruses 62, 76-77
- Human resources 97, 101, 103
- Human T-lymphotropic virus 1 15
- Hungary 98
- Hygiene, personal 43-44, 106, 108
- Hypercholesterolaemia, familial 76

- Iceland 98
- ILO 66, 78, 84
- Immunization 71-72, 106, 108
- India 12, 20, 30, 80, 90, 91, 100, 101
  - disease control 31, 69, 70, 71, 101
  - food and waterborne diseases 38, 39, 41
  - insect-borne diseases 49, 50-51, 53
  - National Institute of Communicable Diseases 64
  - new cholera strain 15, 16, 38
  - plague outbreak 4, 53
- Indonesia 12, 80, 90, 100, 101
  - disease control 69, 89, 100
  - infectious diseases 38, 41
- Infant mortality 13, 14, 71
  - in regions 93, 95, 97, 99, 101, 103
- Infectious diseases (*see also specific diseases*) 1
  - cancer and **59-62**
  - costs 4, 7
  - factors promoting spread **3-4**
  - impact 2
  - modes of transmission 2, 16, 23, 24
  - mortality from 15
  - new diseases - new problems 108-109
  - new and re-emerging **1-2**, **15-17**, 18, **64-65**, 111
  - old diseases — new problems 108
  - old diseases — old problems 108
  - prevention and control **2-3**, **15-23**, **64-65**
  - priorities for action **110-111**
  - responding to epidemics **17-18**, 64, 110-111
  - surveillance 108-109, 110-111
  - trends **105-109**
  - WHO activities **65-71**
- Influenza 7, 8, 17, **29-30**
  - prevention and control 36
  - vaccine 30, 66
- Informatics 87-88
- Information
  - health 85-87
  - health systems/services 81
  - public 90
- Insect-borne diseases 8, 24, **46-56**
  - prevention and control **53-56**, **68-69**, 106
- Insecticides
  - resistance to 20
  - in vector control 54, 55, 56, 70
- Insurance, health 81
- Inter-Africa Committee on Traditional Practices affecting the Health of Women and Children 89
- Inter-American Development Bank 56, 94
- Interferon 34
- International Agency for Research on Cancer (IARC) 59, 76-77
- International Association of Biologists Technicians 89
- International Classification of Diseases and Related Health Problems 86
- International Classification of Impairments, Disabilities and Handicaps 86
- International Commission for the Certification of Dracunculiasis Eradication 45, 67
- International Federation of Red Cross and Red Crescent Societies 66, 98
- International Health Regulations 86
- International Labour Organisation (ILO) 66, 78, 84
- International Medical Parliamentarians Organization 89
- International Organization for Migration 4
- International Union against Tuberculosis and Lung Disease (IUATLD) 21
- International Women's Health Coalition 89
- Internet 86, 87
- Intestinal parasitic infections (worms) 7, 39, 43, 46, 74
- Intra-uterine devices (IUDs) 11
- Iodine deficiency disorders 72, 110
- Iran (Islamic Republic of) 50, 69, 70, 96, 97
- Iraq 90, 96
- Ireland 98
- Iron deficiency anaemia 43
- Islamic Development Bank 89
- Israel 98
- Istituto Italo-Latinoamericano 66
- Italy 15, 66, 69, 98
- Ivermectin 52, 55, 56, 69, 70

- Jamaica 7, 94
- Japan 5, 12, 102
  - Kobe research centre 85
- Japanese encephalitis 8, 24, 46, **49**
  - prevention and control 69
  - vaccine 53, 54, 111
- Jordan 96

- Kala-azar (visceral leishmaniasis) 8, 50, 70, 100
- Kaposi's sarcoma 59, 61
- Kazakhstan 53, 98
- Kellogg Foundation 81
- Kenya 7, 12, 51, 67, 73, 92
  - Medical Research Institute 64
  - yellow fever 15, 18, 48, 49
- Kiribati 102
- Kuwait 87, 88, 96
- Kyrgyzstan 98, 99

- Laboratories, public health 64, 97
- Lao People's Democratic Republic 67, 90, 101, 102, 103
- Lassa fever 8
- Latvia 98
- Lebanon 96
- Legionnaire's disease 15
- Leishmaniasis 24, 46, **49-51**
  - cutaneous 8, 50, 70
  - HIV co-infection 50, 51
  - mucocutaneous 8, 50
  - prevention and control 55, 70
  - visceral (kala-azar) 8, 50, 70, 100
- Leprosy 8, 24, **29**
  - prevention and control 36, 65-66
  - regional reports 93, 97, 100, 101, 103, 110
- Lesotho 92
- Liberia 16, 89, 92
- Library
  - CD-ROM 87
  - WHO 91
- Libyan Arab Jamahiriya 96
- Life expectancy **12**, 93, 95, 97, 99, 101, 103
- Life skills education 75
- Lifestyles **79-80**
- Listeriosis (*Listeria monocytogenes*) 8, 37, 41, 105
- Literacy rates 7-9, 100
- Lithuania 98
- Liver cancer 35, 59, 61
- Luxembourg 98
- Lyme disease 6
- Lymphoma 61
  - Burkitt's 59, 61
  - non-Hodgkin's 59, 61

- Madagascar 53, 92
- Malaria 2, 8, 24, **47-48**
  - control 47, 53, 54, **68-69**
  - costs 7
  - drug resistance 20, 68
  - regional reports 93, 96-97, 101, 102-103
  - in travellers 4
  - vaccine 54, 69
- Malawi 14, 51, 53, 66, 92, 93
- Malaysia 31, 102, 103
- Maldives 100, 101
- Mali 14, 83, 89, 92
- Malnutrition 73
- Malta 98
- *Management of childhood illness* (WHO/UNICEF course) 72
- Marshall Islands 102
- Maternal mortality 13, 103
- Mauritania 92
- Mauritius 92, 93
- Measles 8, 24, **25-26**, 110
  - prevention and control 35, 72, 93
  - vaccine 111
- Mebendazole 46
- Medical education 81
- Médecins sans Frontières 70

Member States **113-114**
Meningitis, meningococcal 8, 24, **26**, 35, 111
Mental health problems 77
Merck & Co., Inc. 56
Mexico 12, 22, 41, 52, 53, 81, 94
Micronesia (Federated States of) 102
Midwifery 81
Migration 3, 4, **9**
Monaco 98
Mongolia 53, 65, 83, 102, 103
Morbillivirus, human and equine 15, 18
Morocco 96
Mortality **12-15**
  age distribution 13
  causes of 15
  child 13, 14-15
  sex differentials 12-13
Mosquitos **46-49**
  control measures 53-54, 55
  insecticide resistance 20
Mozambique 14, 51, 66, 92
Myanmar 31, 41, 53, 69, 100, 101
Mycobacterium tuberculosis, *see* Tuberculosis

Namibia 92
Nauru 102
Neisseria gonorrhoeae (gonorrhoea) 20, 24, 33
Neonatal deaths 14
Neonatal tetanus, *see* Tetanus, neonatal
Nepal 41, 69, 70, 100, 101
Netherlands 68, 69, 70, 98
New Zealand 5, 59, 102, 103
Nicaragua 94
Niger 89, 92
Nigeria 7, 12, 48, 52, 88, 92
Niue 102
Noncommunicable diseases 75-76, 101, 103
  INTERHEALTH programme 75, 76
Nongovernmental organizations (NGOs) 89
Non-Hodgkin's lymphoma 59, 61
Norway 83, 98
Nosocomial (hospital) infections 8, **22-23**
Nursing 81
Nutrition 76

Occupational health 77-78
Oman 96
Onchocerciasis (river blindness) 7, 8, 46, **51-52**,
  control 55-56, 70
Onchocerciasis Control Programme 52, 55, 70, 88
Oral contraceptive pill 11
Oral health 78
Organization of African Unity (OAU) 88

Pakistan 20, 31, 38, 41, 96, 97
Palau 102
Palestine 90
Panama 94
Pan American Health Organization (PAHO) 44, 56
Papua New Guinea 102, 103
Paraguay 56, 71, 94
Parasitic infections, intestinal 43, 46, 74
Paratyphoid 8
Perinatal mortality 14-15
Personnel
  health 97, 101, 103
  WHO 91
Person-to-person, diseases transmitted from 8, **23-37**
  prevention and control 35-37
  WHO activities **65-66**
Pertussis (whooping cough) 8, 24, **26**, 35, 100
Peru 48, 50, 53, 94
  cholera resurgence 38, 94
  disease control 30, 69, 71, 95
Pharmaceuticals, quality standards for 83-84
Philippines 12, 30, 89, 102, 103
Pill, contraceptive 11
Plague 8, 18, 24, 46, **52-53**, 95
  control 56
Pneumococcus (*Streptococcus pneumoniae*) 19, 25
Pneumonia 25, 35
Poland 98, 99
Policy, health **82-88**
Poliomyelitis 8, 24, **30-31**, 100
  eradication 30, 36, 71, 72, 92, 94, 96, 102
  prevention and control 36, 98-99
Polio vaccines 30-31, 36, 71
Politics, global **6-7**
Pollution, urban air 79-80
Population
  aging 105, 106
  and development, conference (1995) 77
  growth 3, **9**
Portugal 98
Poverty 3, 83, 95
Primary health care, Alma-Ata declaration (1978) 63, 64, 82
Psychological problems 77
Publications, WHO 86, 90-91
Public health 106
  laboratories 64, 97
  training and research 93
Public Health Laboratory Information System (PHLIS) 109
Public information 90
Puerto Rico 94
Pulmonary eosinophilia, tropical 49

Qatar 96
Quality assurance 80-81, 93
Quality of life 78
  WHO measure (WHOQOL) 78

Rabies 8, 24, **57**
  prevention 57-58
  vaccine 57-58
Refugees (*see also* Rwanda, refugees from) 3, 4, 6-7, 9, 20, 38
Rehabilitation 78
Reproductive health 11, 13, 77
  services 74
Republic of Korea 11, 15, 102
Republic of Moldova 98
Research
  in child health 73
  health systems 81
  WHO policy 84-85
Respiratory disorders, chronic 6
Respiratory infections, acute lower (ALRI) 2, 8, 24, **25**, 100
  prevention and control 35, 72
Rheumatic fever 25
River blindness, *see* Onchocerciasis
Romania 98, 99
Rotary International 36, 71, 98, 99, 103
Rotavirus vaccine 74, 111
Roundworms (ascariasis) 8, 24, 43, 105
Russian Federation 17, 26, 41, 80, 90, 98, 110
Rwanda 7, 69, 83, 89, 92
  refugees from 69, 90

Saint Kitts and Nevis 94
Saint Lucia 94
Saint Vincent and the Grenadines 94
Salmonella typhi 20
Salmonella typhimurium 20
Salmonellosis 8, 15, 18, **40-41**, 105
Salt
  diethylcarbamazine (DEC)-medicated 55
  iodized 72
Samoa 102
Sandflies 50-51, 55
San Marino 98
Sao Tome and Principe 92
Saudi Arabia 41, 50, 96
Schistosomiasis 7, 8, 24, 39
  cancer and 62
  prevention 45, 67, 74
School-age children **74-75**
School health 74, 80, 99, 108
Science, health 64
Senegal 26, 67, 92
Sewage disposal 11, 43
Sexually transmitted diseases 3, 7, 8, 17, 24, **31-33**, 108
Seychelles 92, 93
Shigellosis, *see* Dysentery, bacillary
Sierra Leone 12, 14, 89-90, 92
Singapore 102
Sleeping sickness (African trypanosomiasis) 8, 24, 46, **51**
  prevention and control 55, 70
Slovakia 98
Slovenia 98
Smallpox 3, 110
Smoking, tobacco 75
Social changes 4, 74
Social Development, world summit (1995) 83, 90
Soilborne infections 8, 24, 37, **42-43**
  prevention and control **43-46**, **66-68**
Solomon Islands 7, 102, 103
Solvents, volatile 74
Somalia 38, 41, 67, 96, 110
South Africa 19, 41, 80, 81, 87, 88, 92
South-East Asia 8, 49, 71, **100-101**
Southern Cone Initiative 56
Spain 31, 95, 98
  National School of Public Health 66
Sri Lanka 58, 69, 100, 101
Staphylococci 19
Staphylococcus aureus, methicillin-resistant 22

Sterilization, female 11
Stomach cancer 59, 60, 61, 77
Street children 74
Streptococci 19
Streptococcus pneumoniae (pneumococcus) 19, 25
Substance abuse 75
Sudan 16, 31, 40, 96
    disease control 67, 70, 97
    insect-borne diseases 50, 51, 52
Supply services 91
Suriname 94
Swaziland 92
Sweden 98
    International Development Authority 80
Swiss Disaster Relief 66
Switzerland 58, 66, 98
Syphilis 17, 24, 33
Syrian Arab Republic 50, 70, 88, 96

Taenia saginata 39
Taenia solium 39
Tajikistan 98, 99
Technical advice 83
Technology, health 64, 85
Telematics 87—88
TeleMedicine 87, 88
Tetanus 8, **42-43**
    neonatal 8, 24, **42-43**, 72, 92, 100, 110
    prevention 45-46
    vaccine 45-46, 111
Thailand 16, 20, 22, 41, 100
    disease control 58, 66, 69, 100, 101
    HIV infection 31, 32, 101
Thalassaemia 76
The Former Yugoslav Republic of Macedonia 98, 99
Tick-borne encephalitis 18
Tobacco use 75
    Tobacco alert (newsletter) 75
    World No-Tobacco Day 1995 75, 90
Togo 83, 92
Tokelau 102
Tonga 102
Trachoma 8, 24, **31**
    control 36, 78
Trade 47
    food 3-4
    new agreements 68
Translations 90-91
Travellers 3, 4, 5, 17, 23
Trematode infections 8, 24, **39**, 105
Triatoma bugs 53, 56
Trichinella spiralis 39
Trichomonas 33
Trichuriasis (whipworms) 8, 24, 43, 105
Trinidad and Tobago 94
Tropical pulmonary eosinophilia 49
Trypanosomiasis
    African, *see* Sleeping sickness
    American, *see* Chagas disease
Tsetse flies 51, 55
Tuberculosis 8, **27-29**, 95
    "directly-observed treatment, short-course" (DOTS) 36, 65
    drug-resistant 20, 21, 22, 28, 65
    HIV co-infection 27-28
    impact 2, 24
    prevention and control 36, 65, 93
    vaccine development 65, 111
Tunisia 70, 96
Turkey 69, 98
Turkmenistan 26, 98, 99
Tuvalu 102
Typhoid fever 8, 20, 39, 105
    prevention 45
    vaccine 45, 111

Uganda 51, 69, 83, 92
Ukraine 26, 90, 98
Ultraviolet radiation 6
UNDP 70, 79, 80, 83
UNEP 84
UNESCO 78, 83
UNFPA 74
UNHCR 7, 66
UNICEF, *see* United Nations Children's Fund
United Arab Emirates 96
United Kingdom 4, 15, 20, 41, 78, 83, 98
    Overseas Development Administration (ODA) 69, 70
United Nations 88, 89
    Administrative Committee on Coordination 73, 88
    Programme on HIV/AIDS (UNAIDS) 66
    regional commissions 88
United Nations Children's Fund (UNICEF) 71, 72, 73, 76, 97
    disease control 67, 70, 98, 99
    environmental health 79
    school-age children/adolescents 74, 75
United Nations Development Programme (UNDP) 70, 79, 80, 83
United Nations Disaster Assessment and Coordination (UNDAC) 90
United Nations Educational, Scientific and Cultural Organization (UNESCO) 78, 83
United Nations Environment Programme (UNEP) 84
United Nations High Commissioner for Refugees (UNHCR) 7, 66
United Nations Population Fund (UNFPA) 74
United Republic of Tanzania 7, 51, 53, 73, 92, 93
    disease control 46, 54, 66-67, 69
United States Agency for International Development (USAID) 44, 66, 99
United States of America 12, 80, 94, 110
    antimicrobial resistance 19, 20
    Centers for Disease Control and Prevention (CDC) 16, 44, 64, 66, 76, 99, 109
    costs of infectious diseases 7
    disease control 58
    emerging diseases 15, 16, 47
    hepatitis C 34, 35
    HIV infection 31, 32
    hospital infections 22
    influenza 29
    insect-borne diseases 53
    travellers from 4, 5
    tuberculosis 28
    water- and foodborne disease 38, 40, 41
Urbanization (*see also* Cities) 3, **10**, 39, 105, 107
Uruguay 56, 68, 71, 94
User charges 80
USSR, former 17, 26, 28
Uzbekistan 98

Vaccines, new and improved 110, 111
Vaginal cancer 59
Vancomycin 19, 22
Vanuatu 102
Vector-borne diseases, *see* Insect-borne diseases
Venezuela 15, 52, 53, 73, 74, 94
Venezuelan equine encephalitis 18
Venezuelan haemorrhagic fever 15
Vibrio cholerae (*see also* Cholera)
    O139 15, 16, 38, 101
    O1 biotype El Tor 38
Viet Nam 53, 101, 102, 103
Vitamin A supplements 74

Wars 6, 89
Wastes
    health care 80
    urban 10
Water
    development projects 39
    disinfection/storage 44
    supply and sanitation 11, 43-44, 79, 93, 106, 108
Waterborne diseases 8, 24, 37, **38-40**
    new and emerging 16
    prevention and control **43-46**, **66-68**
Water Supply and Sanitation Monitoring Programme, WHO/UNICEF 79
Western Pacific 8, 49, 71, 72, **102-103**
Whipworms (trichuriasis) 8, 24, 43, 105
WHOLIS database 91
WHONET 21, 64-65, 109
Whooping cough (pertussis) 8, 24, **26**, 35, 100
Women (*see also* Reproductive health)
    education 9
    health and well-being 84
    healthy aging 79
    mortality 12-13
    tetanus immunization 45-46
    World Conference, Beijing (1995) 84, 90
World Bank 56, 70, 75, 79, 83, 88, 93, 99
World Federation for Medical Education 81
World Health Day 1995 31, 90
World Health Report 1995 85, 90, 111
World Trade Organization (WTO) 68, 83
World Wide Web 86, 87

Yanuca Island Declaration 103
Yellow fever 8, 15, 24, **48-49**
    prevention and control 69
    vaccine 53, 54
Yemen 96, 97

Zaire 51, 53, 70, 92
    Ebola fever outbreak 4, 15, 16, 64, 86, 91
Zambia 51, 69, 83, 88, 92
Zimbabwe 31, 66, 81, 92
Zoonoses, *see[i] Animal-borne diseases*

Infectious diseases are the world's leading cause of death, killing at least 17 million people a year. Most of these deaths are preventable – but instead, the struggle to control infectious diseases has become a global crisis.

No country is safe. Many new diseases, some of them incurable, are surfacing around the world. Others are re-emerging to pose bigger threats than before. Life-saving drugs are becoming less and less effective in combating bacteria and other microbes.

Fighting infectious diseases is crucial to fostering socioeconomic development. As *The World Health Report 1996* makes clear, failure to win control will have catastrophic consequences in terms of delayed development and of human suffering and death.

The report, compiled by the World Health Organization, is an expert global health analysis. Its special focus on infectious diseases shows which of them today are almost eliminated, thanks largely to vaccines; which could soon be controllable; and which will remain our deadliest enemies far into the 21st century.

It looks at all the ways in which these diseases are spread – such as insect bites, contaminated food and water, and sexual transmission. And it breaks new ground in revealing the role of some infectious diseases in the spread of deadly cancers.

It examines contributory factors – from the boom in international travel and tourism, the mass ebb and flow of refugees and migrants, to personal hygiene, and the misuse of antibiotics. It questions the effectiveness of disease surveillance systems. It explains what WHO is doing, and wants done, to combat the crisis, as well as reviewing WHO's work in general.

The World Health Report 1996 combines the world's most authoritative source of recommendations for the control of infectious diseases with a call for action directed at everyone who has a political, professional or personal interest in health.

Price: Sw.fr. 15.–
Price in developing countries: Sw.fr. 9.–
ISBN 92 4 156182 3